

# COMPUTERWORLD

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NCC visitors to the exhibition floor of the New York Coliseum may not notice any superficial resemblance to the above, but the exhibitors are prepared for gladiatorial battle.

## First NCC Promises Five Days of Variety

By Molly Upton  
Of the CW Staff

NEW YORK — Attendees at the first National Computer Conference and Exhibition should find no dearth in the number or variety of sessions

NCC preview coverage begins on Page 31.

and exhibits when the five-day show opens here next week.

Under the chairmanship of Harvey L. Garner, the conference will offer 103 concurrent sessions at the New York Hilton and the Americana hotels while at the Coliseum, about 220 firms will be exhibiting in over 625 booths. The products, led by communications gear, peripherals and equipment for original equipment manufacturers, will be on display for an extended 35 hours.

### Keynoter Returns

The conference marks the return of a keynote speaker, Sen. Philip A. Hart (D-Mich.), who will lead off the conference Monday morning speaking on "A Reasonable Little Bill" concerning industrial reorganization. Hart is known for his interest in antitrust and patent legislation.

Sessions on Monday afternoon also reflect concern over the topics of regulation and legal protection for software.

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At the conference luncheon on Wednesday, Dr. Lewis M. Branscomb, vice-president and chief scientist from IBM, will speak on "The Doomsayers and Human Destiny."

Also at the luncheon, Afips will present two best paper awards for the categories of general interest and specialized contributions. Prizes will be awarded for outstanding displays in the high school science fair.

A special industry luncheon on Thursday will feature an address by Edward N. Cole, president and chief operating officer of General Motors Corp., on "Common Language — Common Future."

Wednesday morning there will be an interim report from the IBM data security study sites. The program was announced by IBM at last year's Spring Joint Computer Conference.

To clarify the large number of sessions for attendees, the meetings are divided into three categories — methods and applica-

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## Calif. Hearing Finds Audit Laxities

## DP Expert on Insurance Lacking

By Marvin Smalheiser  
CW West Coast Bureau

SACRAMENTO, Calif. — Gleeson L. Payne, state insurance commissioner, told a State Assembly committee hearing that until January of this year his department did not have a computer expert to help check out insurance company systems.

Payne also told the Insurance and Finance Committee that his agency did not adhere to its regular, three-year audit schedule with now-bankrupt Equity Funding Corp. of America or other big insurance companies.

Meanwhile, Equity Funding officials have been accused of creating \$120 million in bogus

By Michael Weinstein  
Of the CW Staff

MIAMI — Despite the limitations of IBM hardware specifications, the innovative user can often improve his system operation. This type of innovation has led at least one user to attach IBM-compatible tape drives to a "slow" 360 that would not support the "faster" equipment, according to IBM specifications.

The net result has been "a minimum of 30% better operation" on tape-oriented jobs.

The user is Bob Rackley, Manager of Computer Resources at American Bankers Life Assurance Co., who despite the advice of IBM and the guarded optimism of Calcomp has successfully hooked up Calcomp 347 tape drives to his 360/40. The 347s are plug-compatible with IBM 3420-7 drives.

If he had followed IBM's documentation, this configuration should not work since the data transfer rate of the 347s is stated to be too fast for the channels on the 360/40.

The 347 was announced by Calcomp in December 1971 as a direct replacement for the 1,600 byte/in. IBM 3420 Model 7. Performance specifications of the units are identical: a tape speed of 200 in./sec and a transfer rate of 320 kbyte/sec.

Both IBM in its release of the 3420 Model 7 and Calcomp in its release of the 347 indicated these tape drives were for users of 360/50s and higher.

### Oakland's Ills

Why is it so difficult for the DP staff of the City of Oakland to get a new mainframe? Amidst a bitter bidder protest and many city council meetings there breeds a strange tale. Page 6.

### How to Save?

"What gave us the initial impression that faster tapes could be used with the 40 was the knowledge that other users had

### Spotlight on User's Lib

hooked up disk subsystems to the Model 40 that utilized a faster transfer rate.

"We wondered, if users could

### Documentation Question

## User Does the 'Impossible'

hook up disk drives, why couldn't we hook up a tape drive with a higher transfer rate?" Rackley explained.

Rackley took his question to the local Calcomp office and was told the task was impossible by definition.

"But when I asked why, their (local Calcomp personnel) only response was that IBM said it was impossible.

"We were unwilling to accept

(Continued on Page 2)

## Non-Bell Competition May Be in Jeopardy

By Ronald A. Frank

Of the CW Staff

ST. PAUL, Minn. — A bill now pending in the Minnesota legislature would give the state Public Service Commission (PSC) the power to regulate any supplier which installs or maintains equipment connected to the telephone network. And this would include carrier and non-carrier vendors.

The impact of such a change, if approved, could be disastrous for users of customer-provided communications equipment including data modems and terminals.

It could mean that independent communications equipment would have to be provided to the user at the same rates charged by the telephone companies.

### How to Save?

One of the results of the proposed bill could be to eliminate any cost advantage for non-Bell equipment now available to

users of such equipment.

If all data equipment were regulated, these units (both carrier and non-carrier) might have to be made available at standard rates to the user, one regulatory source said.

This would eliminate the savings now available to users.

The proposed amendment of Section 237.01 of the Minnesota Statutes would change the term "telephone company," to apply to any firm engaged in the "installation and maintenance of telephone equipment which is connected to a common carrier telephone system and its network."

(Continued on Page 2)

### In Tulsa... Telex Rebutts

By E. Drake Lundell Jr.

Of the CW Staff

TULSA, Okla. — Action on the IBM counterclaim to Telex's \$1.2 billion antitrust suit continued last week with Telex rebutting charges that it hired IBM engineers to steal trade secret information.

In the counterclaim, IBM is seeking \$25 million in damages for the alleged theft.

Jack James, president of Telex Computer Products, denied that Telex had hired IBM engineers for the sole purpose of duplicating IBM products.

Telex, he said, had decided to offer a broad product line in the peripherals field and wanted to hire the best people it could.

Since the best talent available in the industry was working for IBM, he admitted Telex tried to hire IBM people to help in this effort.

But, he said, the IBM engi-

(Continued on Page 2)

## 24 Cases Documented

## DP Crime — Who Does It?

By Marvin Smalheiser  
CW West Coast Bureau

LOS ANGELES — The thief who uses a computer to perpetrate a crime is likely to be a white-collar male, 18 to 30 years old, highly rational and deviating only in small ways from his peers.

That profile was given by Donn B. Parker of Stanford Research Institute (SRI) in recent testimony before a State Assembly committee hearing on efficiency and cost control.

Parker told of a study of 24 cases occurring since 1967 involving unauthorized acts associated with computers in local, state and federal facilities.

Surprisingly, none of the cases involved manipulation of computer programs, although his studies of nongovernment environments show several such cases.

Parker noted a "high frequency" of collusion and a surprisingly large number of perpetrators.

"This is common among computer-related acts because of the need for different skills, knowledge and access to carry out an act within the compartmentalized and highly technical computer environment."

Parker said perpetrators' acts differed

only in minor ways from the accepted and common practices of their non-criminal associates.

"In one case of program theft through a terminal, it was revealed at the trial that programmers in both the victim organization and perpetrator's organization had frequent access to each other's computers."

There was also a Robin Hood syndrome in which the perpetrators claimed they were just getting even with large organizations which are harmful to society, he said.

Parker predicted a growing level of crime related to information processing systems.

In particular, he cited a "significant increase in multiaccess system cases" based on the proliferation of these systems.

He said a trend toward increasing computer crime can be reversed by the following precautions:

Type	No. of Cases
Vandalism	4
Theft of address lists	5
Manipulation of checks	4
Manipulation of payroll files and checks	3
Confidentiality violation	4
Unauthorized sale of EDP services	2
Vote-counting fraud	2
Position	No. of Cases
EDP employee	16
Elected official	2
Citizen	2
Private businessman	1
Manager of claims	1
Welfare employee	1
Policeman	1

## Data Learned About Cases

loring precautions:

- Increasing the security of systems to the point where only the most knowledgeable systems programmers associated with a system could penetrate it.
- Establishing norms of professional conduct inhibiting such activities.
- Providing detection and warning features to confront an individual with the nature of his act and to use as a basis for legal action.

## User Accomplishes 'Impossible'

(Continued from Page 1)

The test program was designed to read 32K-byte blocks and write 7K-byte blocks — the maximum allowable under DOS — through the 320 kbyte/sec tape drives.

With his benchmarking program, Rackley flew to the Anaheim, Calif., headquarters of Calcomp. Here, according to Rackley, Calcomp personnel allowed him to use their own 40 with three 347 tape drives attached.

"But they made it clear that while they wished me luck and were willing to provide the equipment needed for the test, they were skeptical and did not take responsibility," Rackley said.

## Multiprogramming Factor

"When we ran our test, everything worked fine, but there was still one factor unresolved. The system we benchmarked had no multiprogramming support (MPS) capability, so we did not know if the tape drives would work in a multiprogramming environment. However, we did know that the tape units would work on one partition."

Despite the uncertainties, Rackley had eight 347s delivered to his Miami installation. He also had Calcomp supply extra parts so that if all failed the 347s could

be field-converted into 345s — identical specifications to the IBM 3420 Model 5 — which is the tape drive documented for the 360/40.

The 347s arrived April 24, or about two weeks ahead of the time the 360/40 was due for delivery.

Worried about the problems of trailblazing, Rackley feared IBM might either refuse to service his 40 with the tape drives attached, or in case of any future troubles might cite the use of unrecommended equipment.

His solution was unique, and startled his Calcomp advisers, according to Rackley.

Rackley wanted to hook the 347s to his existing 360/30. If they did run, then it would be difficult for the installing IBM personnel to argue they would not work on the 40, he rationalized.

He attached the 320 kbyte/sec units on channel 1 of the Model 30 in a switching arrangement with the disk subsystem attached to that channel.

"They ran with no flaws," Rackley related, "so when the 40 was signed off we merely moved them over to the larger machine."

In the present 40 configuration the 347 tape drives have dedicated use of channel 1 while the disk system has dedicated use of channel 2.

## Bill Puts Non-Bell Competition in Jeopardy

(Continued from Page 1)

The amendment would cover data communications equipment, according to a PSC spokesman. As the commission has become more involved with suppliers in competition with the existing telephone companies, it found that total regulation would be required, he said. "It doesn't make sense that we are just regulating half of this industry."

Although some industry sources said Northwestern Bell was actively campaigning for passage of the bill, a spokesman for the AT&T affiliate in Minnesota said his company really had "no position to take" on the proposal.

If the proposal is passed by the legislature, any firm supplying equipment in competition with Bell (and any other existing telephone companies) would have to file a tariff for its equipment, the spokesman said.

One major intent of the bill would be to require the telephone company to offer equipment at fair prices without "undercutting" to meet competition, a PSC

## IBM Delineates Security Plans

By Marvin Smalheiser  
CW West Coast Bureau

LOS ANGELES — IBM intends to spend an estimated \$40 million on its data security-related program, a spokesman testified last week at a State Assembly committee hearing on computer security.

Robert A. Sayles, western region manager, public sector, IBM, said a major portion of the funds will be spent on research and development directed toward the security enhancement of IBM hardware and software products.

Sayles, who was accompanied by Robert H. Courtney, IBM's manager of data security and privacy, said IBM recognizes "a basic responsibility to assist in assuring privacy by making available to the user the technological safeguards in our data processing products that the user may utilize to make sensitive information secure."

It is up to the user, he said, "to determine the need for security measures appropriate to his particular situation" and the degree of confidentiality he requires.

"He then selects the combination of operating procedures, physical security measures and hardware devices and programs appropriate to his particular needs," Sayles said.

Perfect security, he said, is an unattainable goal. "The objective of a data security program is to reduce the risk and probability of loss to an acceptable low level at reasonable cost, while making appropriate provisions for adequate recovery."

Sayles said IBM will continue to work on advanced security measures such as the recently announced system control program "which provides capabilities of protecting one user's programs and data from another's while both are using the system."

Sayles was one of eight witnesses at the hearing held by the Committee on Efficiency and Cost Control.

Mike Cullen, chairman of the committee, said the testimony was reassuring that "there are ways and means of safeguarding information."

He said it indicated that internal auditors may be needed to monitor DP procedures in the state.

Donn B. Parker of Stanford Research Institute (SRI) told the committee of his study of security under a National Science Foundation grant and said DP auditing should be the first line of defense.

## In Tulsa Telex Rebutts IBM Charges

(Continued from Page 1)

neers were hired because of their broad experience and not for their specific skills on a particular product.

James admitted he may have taken some notes on confidential IBM information when he himself left IBM, but he said he was not sure that any of it was revealed to other top management at Telex.

He said he had been warned before he left IBM that he could not divulge any information on the technology IBM was

planning for new products, but that he could use general knowledge gained while at IBM in his new position, even if it did involve some of the general details on some new products.

## Engineers 'Only Human'

Howard Gruver, formerly an engineer on the Aspen project at IBM and now with Telex, said he had never "knowingly" divulged any trade secret information after he joined Telex, but some of it may have slipped into his work on an Aspen-compatible tape controller.

spokesman said. He cited a case where an independent equipment supplier had complained to the PSC about "Bell unfairly lowering its prices" to compete.

But a check of the independent company indicated it had not been the sponsor of the proposed legislation.

Records in the legislature show the bill was introduced by Rep. Robert Johnson whose law firm reportedly represents the Minnesota Telephone Association, an organization of independent telephone companies in Minnesota. Johnson was not available for comment.

The effect of the bill would be "to preclude a situation where either Bell or an independent vendor could cut costs to provide a luxury service to the public," a PSC spokesman said. The commission defines luxury service as any type of equipment, including modems and terminals, that goes beyond a "standard black phone in a home or business office."

The proposed bill was introduced several weeks ago in both the Minnesota House and Senate. The legislature has adjourned without taking action on the measure. The next regular session of the lawmakers is scheduled for January 1974, but the governor could call a special session for "unfinished business," according to one state source.

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# First NCC Promises Five Days of Variety

(Continued from Page 1)

tions, science and technology and special. Several topics will be covered by more than one session, providing attendees with various views. Included in this category are computers and the automotive industry, personnel, computer use in the government and electoral processes, and privacy and security.

A record 56 sessions will be given in the Science and Technology Program, under the chairmanship of Carl Hammer of Univac. Topics to be covered include: communications, hardware and architecture, management problems, simulation and process control, software, education and displays and graphics.

There are 37 sessions in the Methods and Applications Program, directed by Robert W. Bemner of Honeywell.

The special program includes a Day of the Arts, a session by *Business Week* on the Economic Future of the Data Processing Industry, as well as sessions on Marketing Abroad and Venture Capital for the Computer Industry. On Thursday and Friday, a special session requiring separate registration takes an in-depth

look at Managing the Impact of Generalized Data Bases.

## Constituents Participate

Highlighting the broad participation in conference planning, the 13 constituent societies of Afips are presenting sessions in the Science and Technology sector.

The IEEE Computer Society is responsible for the Monday session on Computer Evolution and the Next Decade; Simulation Councils is presenting Simulation: Past, Present and Future; and the American Statistical Association will feature Computing for Statistical Purposes—Expectations Amid Accomplishments and Gaps.

Also on Monday, the Association for Computational Linguistics will present reports on What's the Computation in Computational Linguistics?

On Tuesday, the Instrument Society of America session on Instrumentation, Computers and Process Control will meet at the same time as the Association for

Educational Data Systems' The Use of Computers in Education.

The Special Libraries Association has prepared a session on Specialized Information Processing and the American Institute of Certified Public Accountants will conduct a session on The Auditor's Interface with EDP Systems.

On Wednesday, the Society for Information Display will present Interactive Computing: A Mind Expander while the ACM features Resource Utilization in the Computing Community.

The American Society for Information Science will discuss Information Science and Technology Through the Eyes of Asia. The Society for Industrial and Applied Mathematics session will look at Mathematical Software State of the Art.

Under the auspices of the American Institute of Aeronautics and Astronautics, a session on Data Communications Via Satellite will explore error control and other features of this method of communications.

## Foundation Finishes Organization Draft

Special to Computerworld

CHICAGO — The Computer Foundation Organizing Committee has concluded the work of producing a draft to set up a wide-based organization to carry on the CDP and other programs.

Also, the name of the future organization was changed from "Computer Foundation" to the "Institute for Certifying Computer Professionals."

The final wording of the full document was left to the attorneys working with the legal and organizational subcommittee. It was hoped that the draft would be ready for publication by the beginning of June.

A Speaker's Bureau was set up by the Organizing Committee to provide speakers on the policies and functions of both the institute itself and on certification in data processing in general. Organizations interested in obtaining speakers should contact Jack Beyer, at Chairperson-Pisc, 338 South Warrington Road, Des Plaines, Ill.

## Firm Claims Ford Copied DP System

CW West Coast Bureau

LOS ANGELES — Datamotive, Inc., an El Segundo data processing firm, has sued Ford Motor Co. in U.S. District Court for \$18 million, charging that it violated state antitrust laws by pirating a computer system.

The complaint said Datamotive developed a computerized inventory control system originally designed specifically for Ford dealers to keep track of the dealers' parts and supplies inventory.

The complaint alleged a three-man team sent to Datamotive in 1967 by Ford to inspect operations was actually sent to copy Datamotive's techniques so they could be applied to a system Ford was working on.

A spokesman for Ford said the firm had not seen the complaint and had no comment at this time.

## NCIC Gets Its Man

CANTON, Ohio — Clyde Baird is back in jail facing charges of auto theft and forgery and an additional charge of escape from confinement after the National Crime Information Center (NCIC) computer "fingered" him.

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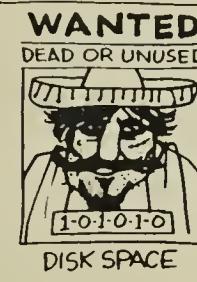
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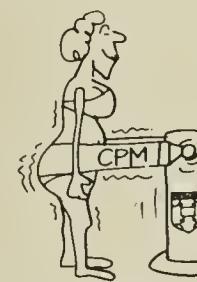
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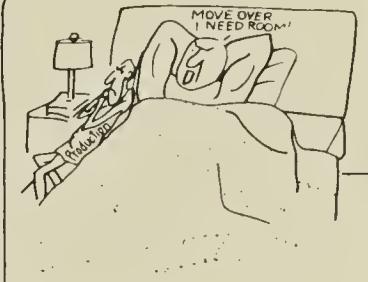
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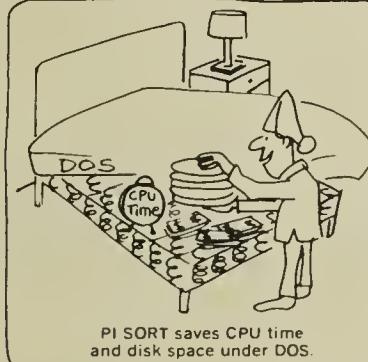
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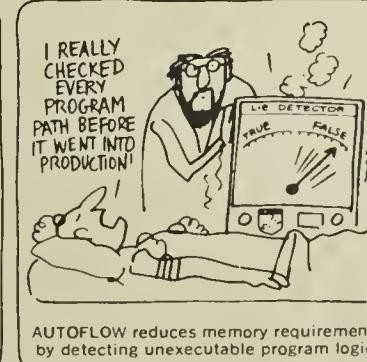
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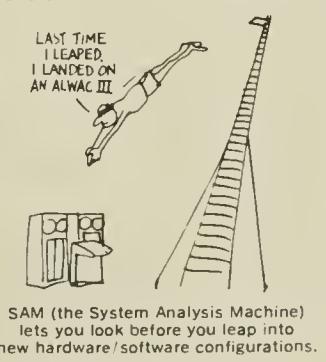
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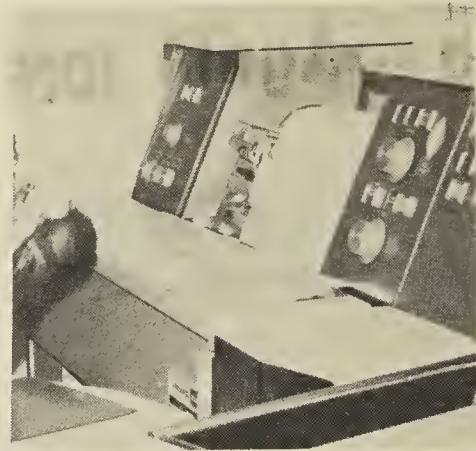
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## Monkey on Trial

Eplu, a three- and one-half-year-old chimpanzee from the Wuppertal Zoo in Germany, has no complaints about job discrimination. Aping the role of an assistant operator at the Univac 1004 processor Eplu took a one-day tour at the Technical Academy of Wuppertal on, appropriately enough, April 1. The chimp quit the job the same day complaining of "personality differences" with managers.

## Europe Journal Reveals IBM 'Political Pressure'

By Joseph Hanlon  
Special to Computerworld

FRANKFURT, Germany — IBM resorted "to the crudest types of political pressure" in an attempt to win a contract in Springfield, Mass., according to the May issue of the *Data Exchange* magazine, published by the Diebold Europe consulting firm.

The magazine, citing *Computerworld* reports of similar incidents, said "further investigation tends to indicate these incidents are not isolated but in fact rather widespread."

There are strong indications, the article continued, that "these incidents are too widespread to be called a local salesman's ploy, but . . . reflect a broader manufacturer policy."

The "snowballing trend of these incidents" has led a user group to consider the possibility of retaliatory action.

The small Government Management Information Sciences Organization, which consists of 40 to 50 city, county and state DP managers, recently undertook a study to determine the extent of the problem and to develop a means of protection, *Data Exchange* said.

The magazine's own investigation turned up the previously unreported example in Springfield. The magazine said:

"Data Processing Supervisor of the City of Springfield, Mass., Leonard Brodeur, related how IBM questioned his competency to the mayor after he decided to cancel a 370/135 order and acquire Univac equipment. The problem originated following a study by Brodeur and the city auditor as to the city's longer-term hardware needs."

"Although a 370/135 was already on order, it was felt prudent to obtain additional equipment bids as the 370/135 cost was 'beginning to snowball.'

### IBM Withdraws

"IBM's 'unbundled' stance and refusal to allow a government discount literally put them out of the price competition and following an unsuccessful attempt to persuade Brodeur that a System 3 would suffice, they withdrew from active bidding."

"The selection of Univac by Brodeur (the city auditor had in the meantime suffered an un-

timely death) resulted in calls to the mayor suggesting that 'Brodeur was not competent enough to make this selection,' that 'IBM had a large building in the city,' and that 'the deceased city auditor would certainly have selected IBM.'

"IBM also suggested that Brodeur was making a 'career mistake' by not maintaining his contact with IBM technology.

### Deaf Ears

"IBM's complaints fell on deaf ears, however, as the city's DP plans had been carefully documented and justified to the satisfaction of both Brodeur and the Mayor's office."

The magazine concluded: "If there is a lesson to be learned from this, it would appear that the well formulated plans of Leonard Brodeur contributed to an early end to the problem in his city, for he was able to clearly defend his position."

It has also been reported that the Commission of the European Economic Community is now working on a document on the European computer industry intended to curb IBM in Europe.

By Michael Weinstein  
Of the CW Staff

DOVER, Del. — This state's procedure of obtaining computer equipment through closed and often secret bidding at each state level is again causing problems.

The last major eruption involved the then state DP director Arthur Hill who wanted to go third-party leasing.

This effort led to complaints of pressure by the state's vendor in concert with local politicians, eventually convincing Hill it would be wiser to obtain another position — he is presently DP director of New Hampshire.

With Hill leaving the state, the pot is brewing again and all the ingredients are still present to renew the computer procurement quagmire, brought on by the lack of public bidding.

Delaware is now considering canceling the contract for the third-party lease with Greyhound and remaining with IBM

## ... Or How to Get a New CPU

By Mike Merritt

Special to Computerworld

OAKLAND, Calif. — After spending months obtaining and evaluating bids for a new mainframe, the DP staff of the City of Oakland has spent four more months dealing with a questionable bidder protest and countless hours at city council meetings, contended with sudden demands for a "long-term data processing plan" in the face of current DP crises, and has been forced to defer to the judgment of a committee of local users who devoted a brief time reviewing proposals.

And, Oakland still doesn't have a new computer, while its DP operations run months behind schedule.

The city's current IBM 360/25 was scheduled for replacement in 1971, but it wasn't until July 1972 that Oakland's DP staff got an OK to find a new mainframe. By that time the 25 was incapable of handling the city's workload; some applications were then running 90 to 120 days late as basic bookkeeping chores preempted machine time.

The DP staff prepared an RFP to which Burroughs, Honeywell, IBM and Univac responded; their systems were benchmarked. A five-person evaluation committee from the staffs of the City and Port of Oakland unanimously recommended the Honeywell proposal, an H2060.

The city's financial director, who has staff responsibility for data processing, wanted outside confirmation of the selection, so the city engaged Lybrand, Ross Bros., Montgomery, a "Big Eight" auditing firm which has been the city's DP consultant since 1969, to evaluate the evaluation.

Lybrand agreed the Honeywell choice was correct, and a letter of intent was sent to HIS in December 1972.

Then the trouble really started. The opening salvo in the battle of the Oakland DP center was a letter of protest from IBM to the Oakland city manager charging

that the HIS system didn't meet bid specs, that the Lybrand review hadn't been objective and that the selection study had been inaccurate.

The IBM protest was apparently based on such things as the definition of a byte and comparison of rental prices.

In the course of meetings of the DP staff and the Oakland City Council, IBM's protest was rebutted and finally disallowed. The protest was effective, though, in bringing the situation before the city council.

A further complication: since the benchmarking HIS had introduced the H2070A, a purchase-only machine with better performance and lower price than the 2060. The city staff altered its recommendation, choosing the 2070A. IBM claimed this was unfair, since the system hadn't been benchmarked.

While this was going on, city officials mysteriously received copies of articles from the *Wall Street Journal* and *EDP Newsletter* disparaging the technical and financial soundness of IBM's competitors.

City councillor George F. Vukasin apparently has no data processing background except an administrative acquaintance acquired while he was a director of the Port of Oakland. In addition, Vukasin was a classmate of the IBM salesman on the account, Winton Mather, at the University of California at Berkeley.

In addition, a former IBM salesman on the account once boasted to a city official that Vukasin and Mather had been fraternity brothers, a fact *Computerworld* has not been able to confirm. IBM has denied they were fraternity brothers.

Vukasin and other councillors also suddenly began demanding a "long-range data processing plan" detailing the city's DP needs for the next five to eight years, before permitting purchase of any new computer.

As the city council meetings stretched on through the spring, and as councillors, including

Vukasin, campaigned for reelection, the situation in the DP department continued to worsen.

To break the logjam, Vukasin suggested that the mayor of Oakland request five large computer users in the city to loan their DP managers for a day or two to review the RFP, the bids, the benchmarks, the Lybrand report and IBM's protest. The council took up the suggestion. Four of the five turned out to be IBM users.

The users' group then temporized. It said that while Honeywell's was the best bid, the city council really should be aware of the possibility that its DP needs might increase greatly over the next eight years, and really should have a long-range plan. As an alternative the group suggested third-party rental for one year while the city staff developed a plan.

So the council directed the DP staff to get third-party bids, apparently depriving all the bidders of an immediate shot at the city's account, but at least keeping the city a user of IBM equipment.

The staff, however, has sent out RFPs to the four bidders as well as lessors. And it looks as though there may be more problems.

The lowest bid from a lessor has been Itel's, proposing a 360/40 for \$140,000/yr. Honeywell, however, submitted a bid of \$100,000/yr for a comparable, and perhaps more powerful, H2050A.

Though the effect to the city will be of leasing the machine, technically the city would have to purchase the machine, though it could return it without penalty any time after one year and before two and a half years.

This is not specifically what the city council requested. The HIS machine would also cost some \$40,000 more for site preparation, which would not be necessary for the 40, from Itel, but would be required for any larger system.

## The Battle of Oakland DP Center

By Mike Merritt

Special to Computerworld

for an interim period, according to Earl McGinnis, state auditor.

The conjecture of personnel opposed to canceling the lease is that after a suitable period of inactivity the state will return to

### What's New in Delaware?

IBM's original plan of upgrading the state's computers to the 370 line.

If this is true, the IBM salesman who threatened Hill in an attempt to keep the account was primarily guilty of bad tactics and bad timing only, a remaining DP staffer observed.

### Spotlight Turns

On another front, with the state under an interim DP director, the spotlight now appears to be on Maya Zistl, DP director for the Wilmington County school district.

Prior to Hill's departure, Zistl was apparently fighting to stop the state from disbanding her

computer department.

The rationale for centralization was based on the fact that Wilmington county is the only one of the three Delaware counties with an independent computer operation.

Since the state performs the same functions for the other counties with its large computers, it was argued that it could also perform Zistl's work (now done on a 1401), and save the taxpayers over \$100,000/yr. But the state was unable to pursue its plan when Hill's position eroded following his hassle with IBM.

In the meantime Zistl stated she was going to evaluate her system and that this evaluation would take some time.

One vendor, NCR, took these overtures seriously and spent considerable time trying to convince her that a Century system was her best option, a spokesman from the firm said. But NCR's efforts turned sour when, in the beginning of April, Zistl announced she had decided to

upgrade to a 360/25 as an interim machine to be replaced with a 370 in a year or two.

Local NCR personnel said they felt Zistl had led them down the garden path to gain time to save her own installation.

A letter sent to local officials from NCR blasted the arbitrary practice of allowing orders to be made without public bidding. The letter also included remarks detrimental to Zistl and pointed out that NCR is a "substantial employer (2,000 people) in the State of Delaware."

McGinnis responded that he knew there were problems and these problems could be traced to the bidding procedures. But, he stated, his hands were tied by the laws and the state attorney general's interpretation.

Despite McGinnis's observations, the general feeling is that the situation will not be changed unless a major political scandal arises as the free-form situation allows for wheeling and dealing for those who want to play the game.

## Bid Procedures Keep State DP in a Stew

# Detroit Tries Computerized Voting -- Again

DETROIT -- If at first you don't succeed....

The "try, try again" spirit was in evidence here recently as the city began "recomputerizing" the vote.

The city experienced many problems in the 1970 primary and general elections, including delays caused by rain-soaked

## News Wrapup

voting cards. Even so, local officials apparently are convinced that computers can be put to work to eliminate some of the delays in vote-counting.

In a recent vote-by-mail election, which would parallel absentee voting, about 7,000 city employees cast punch-card ballots in a race for a position on the General Retirement System Board.

The votes were counted in 34 minutes by a Ballot Tab computer, which is based on a Data General Nova 1210, according to Ron Pollet, head clerk in the elections office.

The chief problem this time, Pollet related, was that some of the voters inadvertently tore the corners of some of the cards, when removing a stub from the form. This stopped the card reader, and the cards were handed into the machine.

City Clerk George Edwards will try to convince the city council to buy one or more of the systems to be used strictly for absentee voting in next fall's mayoral election, local sources said.

A council meeting will be held in two or three weeks, at which

time proposals and arguments will be heard on the computer-vote issue, Pollet added.

## UN School Receives Free DEC Edusystem

NEW YORK -- The United Nations International School has received an educational computer system, the Edusystem-25, from Digital Equipment Corp.

DEC donated the system, which is built around a 12K PDP-8E, with instruction and sample programs.

The system is designed primarily for instruction in mathematics problem-solving starting at the seventh grade level. The system can run simulations in physics, chemistry, biology, earth sciences and the social sciences. The equipment can also be used for remedial and tutorial

drill in mathematics and other subjects.

The system donated has four terminals. Students from over 90 countries will share the system at the UN school.

## DP Brings Labor, Management Together

NEW YORK -- Management and labor put aside their traditional differences over automation recently to introduce a computerized typesetting system at Pandick Press here.

"The manner in which Pandick Press and the union were able to work out the problems involved in the retraining of composing room personnel," Bertram A. Powers, president of Typographical Union 6, said, "is a good example of how it is possible for management and labor to cooperate to their mutual

benefit in the introduction of technological advances."

Under the union-company agreement that accompanied the installation of this system, journeymen printers now employed cannot be laid off because of the introduction of the computer. In addition, an amount equal to 1% of the payroll of typographers in the computer operation goes into an automation fund to help with training and relocation problems.

## CPU Plans Carpools

FAIRFAX, Va. -- The Northern Virginia Transportation Commission recently authorized a \$30,000 project to select carpools by computer for three major employment centers in this area. About 15,000 employees are involved in the three centers.

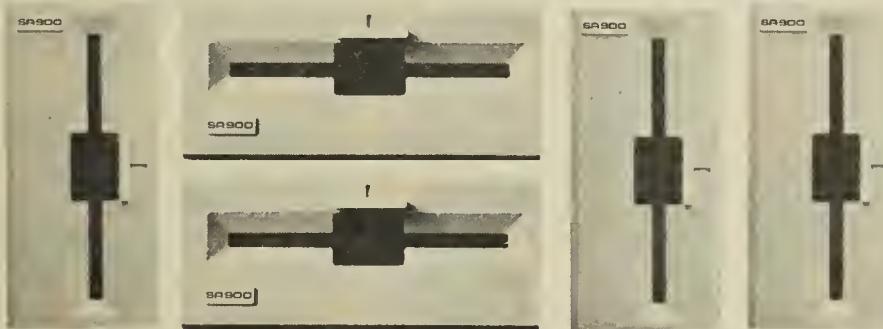


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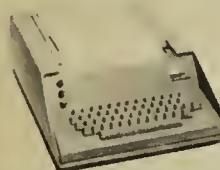
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## Telerate triples business after going "real time" with TI computers

Last October, Telerate Systems of New York installed Cantor Fitzgerald Securities Corp's real-time Government Securities Trading (GST) system...the first of its kind. Telerate also uses the system to supply real-time information on the short-term money markets.

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960A mini-computers were used instead of the large-scale computers usually considered necessary.

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## User Role Is Stressed For DP Site

By Marvin Smalheiser

CW West Coast Bureau

SAN DIEGO — To make a new installation effective the user must be prepared to marshal the right resources and then manage them, an NCR official told a user conference here.

Stephen E. Loewy, assistant vice-president of Systems Services, said the user has to share responsibility with the supplier for a profitable EDP operation.

"The vendor," he said, "has the right to expect the user to be prepared for installation of his computer."

"I don't mean just the visible, more obvious preparations such as the physical site, air conditioning, files and electrical requirements, but the less obvious adjustments that are absolutely mandatory to make things work smoothly."

Loewy said all levels of personnel must be educated so they understand the changes that will be occurring.

"Those who will utilize the results of the new system must be included in the development plans so that they understand what is being done, why it is being done and how it is being done."

"This is not the time to make change for the sake of change alone. Modifications should be made only to improve operations or to get data otherwise unavailable."

The user, Loewy said, has the right to expect "a product of high quality not only in a manufacturing sense but also in its design philosophy."

Loewy said it is the manufacturer's responsibility, within the constraints imposed by the marketplace, to provide quality products and service.

## Criminal Justice Conference Theme

NEW YORK — "New Systems in Law Enforcement and Criminal Justice" will be the theme of the National Annual Government Data Systems Conference. Sponsored by New York University and the New York Management Center, the conference will be held June 6-7 at New York University.

Director of the program is William A. Kulok, New York University, Division of Business and Management, 600 Third Ave., New York, N.Y. 10016.

# The Machines Sit and Wait Because of Building Delays

By Edward J. Bride  
Of the CW Staff

HOUSTON — For lack of a nail, the system was delayed. For lack of the system, money was wasted.

Delays in constructing a new municipal building here are cost-

ing the city more than irate tempers. An estimated \$175,000 has been spent, local sources claim, for leasing computers that have never been implemented.

Douglas L. Williams, director of the city's DP operation, confirmed that the system, a Honey-

well 632, "is available. We're behind schedule, not the company."

The 632 is to perform message-switching functions for the police department's Univac 418-III, but the project is running four to six months behind schedule, Williams said.

## Other Delays

The building is only one of several delays, with others including Univac system software in name-matching algorithms, and a shortage of municipal personnel, he related.

An additional delay is being caused by problems with the

state's installation of a 2,400-baud line to Austin, he continued.

Since the message processor is "available" and working, the city is required to pay its lease, Williams also said. Municipal data processing employees are performing development work on the unit, at the facilities of Urban Systems and Services, the supplier of the hardware and some of the software.

If the rest of the implementation process goes as expected, the city may have its system by the end of the year, spending another \$60,000 before being completely on the air, Williams

noted.

When complete, the police department will have an on-line jail-booking system with other on-line terminals (including CRTs in courts) to follow individuals through the judicial and corrections processes, he said.

The goals of the system include providing more information for police in the field, doing this without an increase in paperwork, Williams stated.

His problems have been compounded, he continued, by the difficulties of explaining technical details to non-technical politicians, who are concerned about the wasted money.

## Student Builds Microcomputer

By Ken Shonk  
Of the CW Staff

BOZEMAN, Mont. — A microcomputer designed and built by a Montana State University senior in electrical engineering can be used to analyze systems and debug programs.

"I set out to build a small computer for use in fixed applications, but one that could be reprogrammed without having to go through the costly process of programming an ROM," Dan Cheever, the designer, said.

The basic building block in the microcomputer is an Intel microcomputer set which is a complete CPU on an LSI gold chip — but which is designed to use read-only memories of the type that cost \$600 to program.

Cheever put the system together so that the software could be changed at any time by using a random-access type of read and interfacing the CPU chip so that any type of memory could be attached to the unit.

### Mainly for Testing

"The system is mainly for testing," according to Cheever. "If someone wants to build a system using the Intel chip, they would use a similar system to build up the prototype, making changes in the programming and the hardware as they find problems. Once in the final configuration, they could program an ROM for the application and use a system that isn't intended to be reprogrammed."

Don Bjork, one of Cheever's instructors who works in the Electronics Research Laboratory at Montana State University, said the "special topics" project has a number of possible application areas.

The Montana Power Co. participated with the department of electrical engineering in funding the project. The company is also considering the use of the microcomputer at substations for gathering data in fault detecting.

### Intricate Interfacing

The key to the system is the

## OCR Users Set To Meet in June

ANNAPOLIS, Md. — "Source data capture and required controls" will be the theme of the OCR Users Association Conference June 11-13 at the Annapolis Hilton Inn.

Dr. Ruth M. Davis of the National Bureau of Standards will deliver the keynote address, followed by concurrent multimedia and forms sessions on Monday.

Tuesday morning offers concurrent hand-print and OCR applications sessions, including sessions on "how not to reinvent the OCR wheel," by W.J. Goff of Minute Man Data Services, and "order form scanning," by R.J. Shallow of Ship 'n Shore.

The OCR Users Association address is P.O. Box 106, S. Hol- land, Ill. 60473.

interfacing Cheever worked out, enabling the whole system to be run off the bus structure he built to interface with the transistor-transistor logic. The system can also be interfaced with tape readers or any kind of memory quite simply, he said.

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## Fraud Squad Next?

CW West Coast Bureau

LOS ANGELES — An informal program is underway here to train Los Angeles County Sheriff's deputies to handle computer crime investigations.

An official said five deputies have been working with automated systems as part of their regular duties and have also been training to prevent theft and misuse of data in the sheriff's department.

Although they could also conceivably be used for external computer crime investigations, the present focus of the deputies is on internal computer crime prevention.

The spokesman said the deputies have been taking courses involving studies of case histories, security system planning, software security and computer-oriented fraud.

The training began in June 1971 and has continued on a limited basis with no present plan to expand or formalize it.

## Application Transferability

# Cross-Configuration Software a 'Must'

By Don Leavitt  
Of the CW Staff

JACKSONVILLE, Fla. — There is an "urgent need for development of a generalized file management software package" which can be operated at any computer site, covering a "reasonable range of sizes and compatible with all major computer hardware," according to Andrew S. Atkinson, executive director of the Government Management Information Sciences (GMIS) users group.

Speaking here recently at the group's annual conference, he warned that transferability of application programs, long the goal of DP users, will never be completely successful until the more basic problem of cross-machine-compatible systems-level software is solved.

The federally funded Urban Information Systems Inter Agency Committee (Usac), already working on the application transfer problem, would be the

natural group to work on the more general project, he said.

Though looking for the generalized file management system primarily as a solution to the problems of state and local government users, Atkinson agreed development of such a cross-configuration software "bed" could have profound effect on application programming throughout the DP community.

If it works, most programs utilizing the system would be transferable without being adapted to a new machine, a process — in Atkinson's view — that often requires more effort than coding the application from scratch.

The computer-independent standard communications and file management system to be developed by Usac should be adaptable to classes of hardware with "minimal adjustments or modifications," he said, and should accommodate high-level languages such as Cobol or Fortran.

It should be able to accommodate free-form file formats, work with a wide range of access methods for both sequential and random files, and be adaptable to handle either real-time communications or batch-oriented application systems.

### Get a Head Start

Atkinson admitted this proposed "GMIS Project 74" may still be beyond the state-of-the-art to implement in fact, but argued that a lot of work can be done now in defining the possible parameters of such a system.

A task force of federal, state and local users, and representatives of each hardware manufacturer, should be established as the first of four phases in the development project, he said.

This task force might spend a year identifying desired parameters and characteristics as a conceptual design of an ideal communications/file management system. This effort would include a review of many systems currently available, Atkinson said, and the one closest to the ideal would be selected for further work.

The task force should perform whatever enhancements are possible within a "reasonable time frame," he said, to make the chosen system as complete as possible before being installed in a number of test sites.

Implementation and evaluation of the generalized system, phase 3 in Atkinson's proposed project, would overlap the end of the basic selection/modification phase and would probably entail further tailoring of the system in the light of actual experience.

Development of standards for communications, file formats, application program structures and possible "clearinghouses" for shareable programs would not be attempted until the system had been through its "shakedown cruise."

The program or work laid out by Atkinson would cost an estimated \$500,000 and might be complete in two years. Full-time technical specialists would, he hoped, be made available by agencies and hardware manufacturers

## University DP Ends City Election Ills

COLUMBIA, Mo. — What does a city do when it lacks elected officials? The city of Columbia almost found out.

The city election returns were scheduled to be tallied on the main computer at the University of Missouri-Columbia, but the failure of a voltage regulator caused the CPU to go down and there was no way to get it up in time to get the returns out.

MFA Insurance Companies offered its services, since it had the only computer in town with the IBM 2501 card reader needed to read the punched cards.

It was no problem at all, according to Don Goodwin, MFA Insurance vice-president in charge of data processing.

"The university people brought the programs over here," Goodwin said, "and it was just a matter of running them on our machine. It only took one partition of our system, so we could process most of our normal business at the same time."

### DP 'Checks' Treasury Checks

WASHINGTON, D.C. — A computer is limiting the U.S. Treasury's check-writing capabilities. The Treasury, which each year disburses something like \$200 billion, cannot write a check for more than \$99,999,999.99 due to software limitations.

"Ordinarily that does not cause us too many problems," a Treasury spokesman said. "On the few occasions when we do have to go above \$100 million, the agency making the payment makes out two vouchers and we make out two checks, he said."



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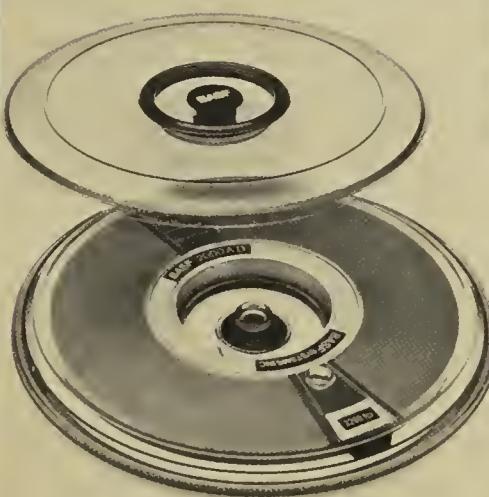


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## Editorial

### Updating the News

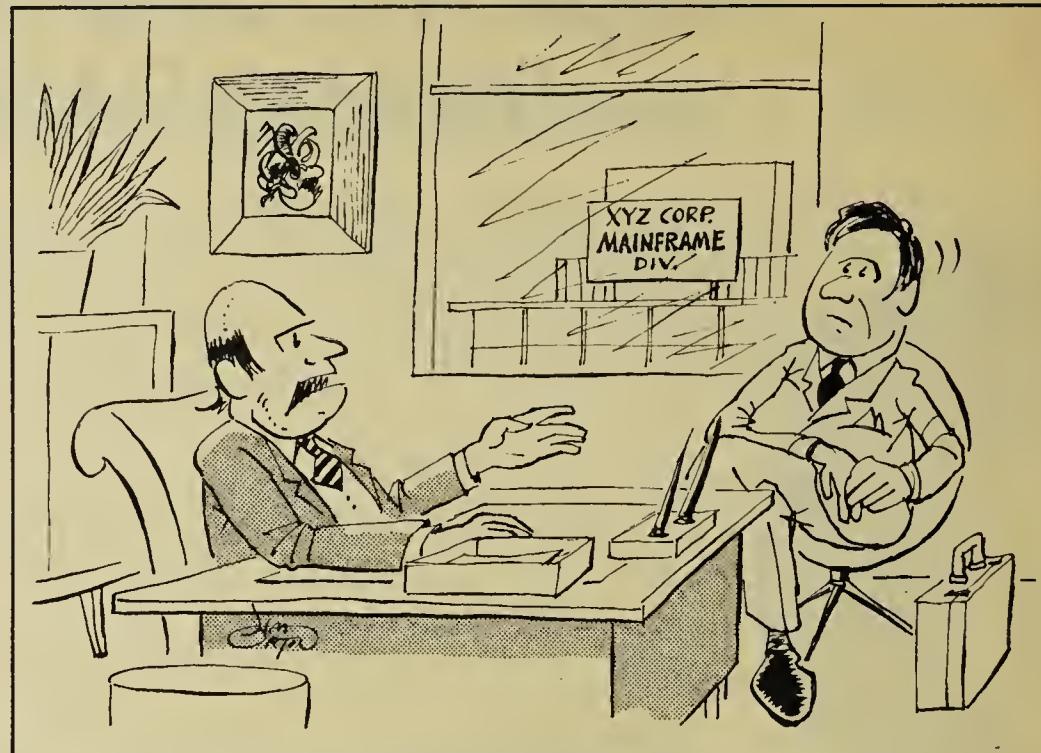
From time to time users have asked us for more information from the documents released in the Telex/IBM antitrust suit or for clarification of stories based on those documents.

The file of material released in the case is massive — it amounts to over 25,000 pages — some hard to read and some practically illegible.

Early in the case, we made the decision to get as much information to our readers as possible in the shortest possible time. Because of this, not all the documents had been read, classified and examined in depth when the first stories began to appear.

Because IBM changed marketing and product plans over the time period covered by the documents, there may be some discrepancies between earlier stories and information uncovered later.

So if you notice any differences on products and facts, you can assume the latest story contains the most up-to-date information.



**'Are We Secure! We Need a Display for Our New Multiprocessor  
But Division Security Won't Even Release the Specs to the Peripherals Division!'**

## Letters to the Editor

### RBP Exam Passes Test: Fine Judge of Ability

I have just returned from DPMA's RBP (Registered Business Programmer) certification exam. I had planned merely to make a quick evaluation of the test based on the preconceived assumption that the exam was inadequate. I was never more wrong.

I have been in the field of data processing for over 10 years and for the past few years have been very active in an "underground" organization called Quality Data

Processing. QDP has one primary reason for existence — to promote quality and professionalism in the field of data processing. It was in the capacity of an evaluator for QDP that I sat for the RBP exam.

The RBP exam is by far the finest measuring stick of programming ability yet devised. Lately there has been considerable press (pro and con) about DPMA and its CDP (Certificate in Data Processing) certification exam. Unfortunately, little has been said about the RBP exam. In my opinion, DPMA has a

"sleeper" on its hands. If any criticism is due DPMA, it is for lack of promotion of a fine exam.

The RBP exam is an excellent test for verifying programming ability. It has two sections. The first covers common programming principles. The "flavor" is definitely Cobol, but a bit of everything is intermixed. The questions are written with extreme care and none are of the "trick" question type.

There are some questions of the book definition variety, but the terms were primarily those

commonly used throughout the profession. The first section required some problem solving and section two was completely devoted to high-level problems.

Because of the part the RBP program plays in the upcoming Institute for Certification of Computer Professionals (formerly the Computer Foundation), I feel it is necessary to set the record straight. Therefore QDP and I wholeheartedly support the RBP program. RBP has passed the test.

Robert Sennet  
Bartlett, Ill.

### How Long to Decide When AT&T at Fault?

Re AT&T Blames Non-Bell Equipment [CW, May 16]:

I would be interested in the details of the figures AT&T called out in the article. If 48% of the 10,224 trouble calls were caused by non-Bell equipment and 38% were caused by telephone company equipment, what caused the other 14%?

It took "30,000 unnecessary dispatches" in 4,973 cases to tell the customer his equipment was at fault. How many "dispatches" did it take to determine the telephone company equipment was at fault?

When someone has a data communication problem, one of the first persons he calls would be the telephone company, but he doesn't unless he is a very large user of telephone services. The tendency is to send someone out in a couple of days.

The first person is normally a telephone installation type who will have to get a data communication type out with the proper equipment. This is why it takes six or more dispatches to correct a problem.

I would like to know how many times the telephone company has dispatched someone when the problem was not a data communication problem as compared to how many times a computer customer engineer has been called for equipment failure and the problem was in the telephone system.

C.A. Cline

Raytheon Service Co.  
Santa Ana, Calif.

### The Church and IBM

Why in the world does the Episcopal Church have any business in criticizing IBM or any other business enterprise? Why should anyone comply with any of its requests except if they are users of something. Does IBM tell the Episcopal Church how it should operate?

T.C. Eickmeyer

Dayton, Ohio

(Other letters and viewpoints on Pages 11 and 12.)

## Generalized Software Often Justified

By P.E. Borkovitz

Special to Computerworld

While Tom Gilb [CW, May 16] appears to be attacking the concept of generalized data base software generally and IBM specifically, he is, by implication, indicting the entire independent software industry in defense of the principle of in-house development of software needs. I don't think that's fair either to the software industry or the many thousands of users who rely on it for assistance.

The factors cited by Gilb as justification for not procuring outside proprietary software products are the same factors which responsible vendors of such products urge their customers and prospects to use to evaluate products prior to a make-or-buy decision. However, to see such factors used in so one-sided a manner, to justify in-house development as opposed to outside procurement, sounds like a rationale for the principle of "not invented here."

### Viewpoint

No vendor of software products can do business successfully today without proving cost/risk justification beyond a reasonable doubt, simply because user management has become knowledgeable and sophisticated enough in computer-related procurement to reject any buy-recommendation which lacks that essential decision element.

In regard to Gilb's specific points, I offer the following:

• Portability. It is obvious that

a user has a far better chance of assuring portability by dealing with a vendor who stands to lose a major portion of his customer base if that element is lacking.

• Implementability. If I were a user, I would be quite offended by Gilb's lack of regard for my ability to conduct a complete and objective product evaluation.

I can recall, without even consulting my files, at least six specific instances in the past 18 months where exactly that kind of comparative test was conducted prior to a make-or-buy decision. In every instance, the decision was made to buy, based upon solid, irrefutable evidence.

The whole thrust of the industry today is away from restricted, specialized applications

using individual files, and toward more generalized approaches to applications using a common data base, capable of change and adaption as requirements and technologies alter and advance.

• Maintainability. One of the most dominant reasons for acquiring an outside product, particularly in the area of utility software which is used day in and day out, is to avoid the costs and problems inherent in maintaining complex software. Responsible vendors insist on maintaining their own products.

Further, most vendors are quite willing to evaluate user requests for viable modifications, thus totally obviating the need to have "a system programmer staff."

• Operational cost. This is obviously a part of any procurement evaluation. Furthermore, a vendor whose business depends upon successfully marketing a product is far more likely to pay close attention to operational efficiency of his product than a user, who is usually more concerned with simply getting a needed system operational in the shortest possible time frame.

• Software Reliability. As with portability, the user's best assurance lies in the fact that the vendor's ability to remain in business is inextricably tied to the reliability of his products.

Again, fixing any errors that do occur is the vendor's responsibility, not the user's, and a properly-evaluated vendor does have both the documentation and the competence, as well as the motivation and usually an effective procedure, for timely bug-shooting.

• Supportability. As with reliability and portability, the user's best benefit in this area lies in the vendor's need to maintain his customer base.

One common way is to guarantee to support standard hardware and software releases. Furthermore, failure in this area is a far more common occurrence among "tailored" software, than among generalized packages.

• Data Security and Reliability. Again, Gilb is generalizing, and seemingly ignoring the role of adequate procurement evaluation (since he apparently doesn't feel the user is capable of such evaluations). Many file-security devices are bypassable at the user's option.

If a system has inadequate recovery/security features, simply don't buy it! Competitive forces in the marketplace will force that vendor to cure the defect or kill the product soon enough!

P.E. Borkovitz is vice-president, software products division, Applied Data Research, Inc., Princeton, N.J.

# Disputes Aired, Public Money Protected in SPDP Plan

The Society of Professional Data Processors, which was initiated by a number of *Computerworld* readers last year, has been remarkably active in a way that few societies are. It has been active in setting up its structure to match its goals — and finding out what its members want as goals.

The process has resulted in a society which insists that its members agree that their membership can be suspended (after due process) and that they should be suspended if they are found to be in breach of professional standards.

The SPDP membership selected as its first important task the creation of enforceable standards.

And with this in mind, President Hamilton Armstrong pointed out, membership could not be thought of as just to be obtained by paying dues, but instead must be discretionary.

The society has also faced up to the problem of trying to have meaningful elections. Armstrong's answer here is also a novel one. He doesn't think biographies of potential candidates are enough. Nor does he think it is enough to provide space in the society newsletter to other candidates for office to make their sales pitches.

He argues that it is necessary for the ordinary member to see how the leadership differs in the emphasis it puts on subjects week by week and month by month so that when the elections come, the membership is already aware of how the candidates will react.

This type of development has some strong structural effects on the way the society has been designed. What is hap-

pening is that Armstrong's ideas — because he is the current president — are written up and sent in advance to other society leaders. Any member can get access to these just by agreeing to review them and return comments quickly.

## Disagreements Aired

Then, when the newsletter comes out, it headlines not the Armstrong policies as such, but instead the differences between his policy as stated and the way the other leaders feel.

This way the members see the areas of disagreement or confusion, the attitudes of the various potentials, and only after they have the environment fairly well organized in their minds, can they understand the lengthy policy statements.

Nor is membership action finished at that point. A review form, together with the policy statements, goes out to members to have their views recorded on the major items.

Armstrong thinks these reviews are important because he feels membership control should be more than simply the selection of people. It should also be the selection of what areas are to be emphasized and which areas the membership doesn't want emphasized. "If they can't turn you off a subject, then they just don't have control," he said.

This means that certain areas, although generally agreed upon, may go back to the membership time and time again. At the moment one of the issues is about the problem of the classes of membership.

Two classes of membership have been suggested — one for people who could adopt the full professional code of ethics at this point, and one for people who (perhaps because of employer situations) could not adopt it until it became the industry's standard.

The solution currently being suggested is that the code be developed in two levels, instead of having two membership

## The Taylor Report

By Alan Taylor, CDP



## How Do You Rate Society's Structure?

In order to ensure meaningful elections, the SPDP is proposing to air members' disagreements with executive policy and print them in its newsletter. Is this:

- Useful
- Dangerous
- Unimportant

Why?

In order to provide for enforceable standards, the SPDP is proposing to insist that members agree to accept suspension procedures, as well as other membership qualification (only DP practitioners and teachers are accepted). Is this:

- Useful
- Dangerous
- Unimportant

Why?

In order to provide for financial stability and for the protection of the public interest, the SPDP is proposing to incorporate a "separation of powers" into its constitution. This will reserve certain power and resources to guardians of each of these areas, and certain power with the president and executive committee. Is this:

- Useful
- Dangerous
- Unimportant

Why?

What other advice would you give to the SPDP before its constitution is written?

Name \_\_\_\_\_

Professional Position \_\_\_\_\_

Address \_\_\_\_\_

Are you interested in joining SPDP (\$20/year dues)? Yes/No \_\_\_\_\_

After completion, please return to SPDP c/o Alan Taylor, Computerworld, 797 Washington St., Newton, Mass. 02160.

classes. One level would deal with the operations that must take place in any event, and the other ones which should not necessarily force the member to either forfeit good standing with the society or his position with his employer.

Another structural part of the society currently being reviewed by the membership is how to protect both the finances of the organization and also the ethics.

## Separation of Powers?

Armstrong's suggestion is that there should be a form of separation of powers. He also said membership interests and votes should have some limitations. Membership voting should be somewhat limited, he said, where it involves a business decision which would force the society to abandon stated business objectives (such as building up a reserve fund with

10% of the membership dues) or else when a public interest item was shown to be impacted.

Armstrong said the structure is now ready to support meaningful elections, support enforceable standards and provide for the protection of public and business areas. The society is now ready to do what most societies would have done first — set up a constitution and bylaws.

The society is open only to members of the data processing profession or those teaching data processing. In its decision as to whether to go ahead with the constitution at this point, Armstrong is interested in hearing not only from SPDP members, but also from other community people. There is a box above to give your opinions on this way of developing a professional society.

## Letters to the Editor

### Equity Funding Scandal A Black Eye for DP

As a DP professional, I cannot understand Alan Taylor's attempts to whitewash the Equity Funding scandal as not being DP-related. In two separate articles [CW, April 25], Taylor attempted to convince us that DP was merely incidental in this affair. Unfortunately, such is not the case.

The question of whether report generators, test data generators or an IBM 360/30 are "sophisticated" is comparative and not really relevant. The important points are that the computer was used to run "simulation studies" that were needed for the fraud; a programmer did in fact program false reports; and the DP manager did not act ethically on his suspicions but instead hoped for a cover-up or a new job.

This scandal is one that DP must take on the chin, along with the accounting profession.

Martin H. Tillinger  
Systems Consultant

MHT Services  
Jersey City, N.J.

### Communication Groups Listed

Do you have the addresses of the telecommunications associations which appeared on Page 40 and 41 in the April 25 issue?

Robert R. Korfhage  
Dallas, Texas

Communications Systems  
Management Association  
1102 West St.  
Wilmington, Del. 19801

International Communications  
Association

c/o Frank T. Burns  
3 M Co.  
St. Paul, Minn. 55101

Association of College &  
University Telecommunications  
Administrators  
Luther R. Robb, President  
Pennsylvania State University  
State College, Pa.

Telecommunications Association  
c/o Roger Underwood  
Kaiser Aluminum & Chemical Corp.  
300 Lakeside Dr.  
Oakland, Calif. 94604

### Computers for All Banks!

In reference to the April 25 article entitled "Small Banks, Beware of DP!"; to the uninformed and uninitiated this headline is particularly misleading as are the first and third paragraphs.

For those of us who sell computer services to banks the article has waved a red flag in front of our customers as they are being warned about automating their various banking functions.

In actuality Wille's message refers specifically to banks with under \$25 million in deposits which have set up their own on-premise computer operations.

By far the majority of our correspondent bank customers has deposits considerably less than the figure mentioned, and all of them should have the opportunity of availing themselves of the many advantages of electronic data processing.

Robert G. Ziemer  
Vice-President

EDP Sales and Service Div.

Northwestern National Bank  
of Minneapolis  
Minneapolis, Minn.

## 2260 DUCS 3270

We are pleased to announce the availability of DUCS-V (Display Unit Control System - Version 5). DUCS-V will concurrently support both the IBM 2260 Display Unit as well as the IBM 3270 Display Station in a local environment. The 3270 Display Stations are simulated in 2260 mode with no alteration necessary to the user's programs. The basic DUCS-V Program (2260 support only) is a licensed program product available from CFS, INC. for a monthly lease fee of \$25.00. The DUCS-V 3270 simulator feature is also a licensed program product available for an additional \$15.00 per month. The 3270 Simulator may be added to any DUCS-V System subsequent to the initial installation of DUCS-V without user reassembly or linkage editing.

DUCS-V will be available during the 3rd quarter of 1973. Version 6 will support both local and remote IBM 3270 Display Systems providing users with a convenient means of utilizing the enhancements of the IBM 3270 System.

Requests for DUCS-V should be submitted to CFS, INC. License agreements, DUCS-V abstracts and other details will be sent by return mail. Inquiries may be directed to Mr. Richard K. Goran.



CFS, INC. POST OFFICE BOX 662  
BROOKLINE, MASS. 02147 (617) 731-3474

# RPG, or Running Circles Around a Cobol Programmer

By Tom Crenshaw

Special to Computerworld

The response to the battle between RPG and Cobol has been most interesting.

I have been in the data processing business for 24 years, more than half of my life. During that time I have seen the advent of the computer and its impact on business and everything else. I have seen the passing of machine language programming and the beginning of symbolic programming, whatever name you want to give to a compiler or an assembler.

I have used 1401 SPS, RPG and Fargo; 1410/1401 Autocoder; 360/20 RPG and extensions; 360/20 PLI; Honeywell RPG and Cobol C; to mention a few. My first love (and don't we all have one) is Autocoder.

The main reason for Cobol in the first place (if memory serves me right) was not to solve all data processing problems with one sophisticated language, but to have a common language that could be applied to all manufacturers' computers with a minimum of reprogramming when

an outfit changed to a different vendor. It has been enhanced many times since it first came out and can now be used to solve nearly any business problem.

## Steady Progression

The original 1401 RPG was strictly a

## Viewpoint

step to the computer from tab equipment and really didn't do any computer-type processing. The RPG that came out with the 360/20 didn't resemble the 1401 RPG, except in name only. That gave us an RPG that could handle most business data processing needs. I say "most" because there are certainly many jobs for which an assembler is needed.

I have recently written a program in Cobol for an invoicing routine. It took nearly 1,000 statements. A similar program that has been used for quite sometime and written in RPG takes less than

half as many statements. Both do the required job. It took several hours to flowchart the Cobol program and many hours (I don't know just how long, but a long time) to write the program. Then it took a long time to keypunch and verify the program cards.

With the RPG program, no flowchart was necessary, only notes showing what needed to be done. The keypunching and verifying of the program cards did not take nearly as long as the Cobol program because there were so many less cards to do. (By the way, I used the RPG listing to flowchart for Cobol.)

Then came debugging after finally getting a good compile. With Cobol, each statement has to be read to see where a certain name is used that is causing a particular problem. With RPG the factors or result field can be scanned rather rapidly to see where the name is used.

Some say that RPG cannot be flowcharted. That is not true; it can be. But many times you don't need one because the program listing is so easy to follow.

The RPGs currently available allow complete freedom to process any file type in any sequence necessary. Lines can be printed anytime desired, subroutines used, debugging, tables, switches, arrays, totals, matching-records, chaining, branching and all arithmetic, compare and move operations. Table lookup in RPG is far simpler than in Cobol. And how about matching records!

I'm sure there are many complex jobs that RPG cannot handle efficiently, especially on a large system, but I have yet to see a business-type application in which a good RPG programmer couldn't run circles around a good Cobol programmer and have time left over.

I believe that all the computer manufacturers realize that RPG is the language for business applications. All of the major vendors have one, and they are relatively compatible, maybe even more so than Cobol.

*Tom Crenshaw is head of data processing at Visador Co., Jasper, Texas.*

## Letters to the Editor

### RPG and Cobol? But What About Alternatives!

Along with Reginald D. Gates [Viewpoint, CW, May 9], I've been interested in the exchange of letters over RPG II. I received my original 360 training in Assembler, Cobol and RPG. Since then, I've used all three of the above and two others: PL/I and Adpac.

I've found it extremely interesting to note that the letters have become almost Cobol versus RPG II. What about the other alternatives?

I've found both PL/I and Adpac to be preferable to either. My personal preference for business applications is Adpac. Since Gates has pointed out the weaknesses of RPG, perhaps those of Cobol should also be aired.

If the Achilles heel of RPG may be that it doesn't readily lend itself to being maintained by a programmer other than the author, that of Cobol (or just about any language) is that it doesn't either.

Granted, Cobol's weakness is that it isn't written well generally, but that effectively kills the "self-documenting" aspect of Cobol. Adpac, on the other hand, is a "structured" language which has some predefined logic.

Because of this, it is self-documenting in a way that no unstructured language can be without the enforcement of good standards. And, as with any language, good standards followed during writing and modification greatly aid future modifications.

Cobol is also inefficient both in core utilization and speed. Adpac requires less core and time to execute both the compiler and the problem program.

Both Cobol and Adpac are relatively easy to debug and transfer from DOS to OS. They are also both able to be used for modular and conversational programming. Adpac, however, generates completely self-relocating code on the DOS level. This can be extremely useful to the multiprogramming user who chooses to take advantage of the 360 series price reductions and the lower overhead of DOS.

An Adpac program can also be written and running in less time than Cobol. And, as opposed to RPG, it comes with several documentation and programming tools. Uncode produces documentation; Libra provides a much more generalized method of updating IBM Source Libraries; and, finally, for those who want the availability of "industry standard" coding, Polypac converts Adpac into extremely good ANS Cobol.

Martin L. Stahl  
Silver Spring, Md.

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# SOFTWARE & SERVICES

## Random Notes

### Smaller Distributors Gain H200/2000 Inventory System

WALTHAM, Mass. — Small to medium-sized distributors can handle stock status reporting, forecasting and replenishment applications on 24K H-200/2000 series CPUs with the Inventory Management System/II package now available from Honeywell.

Distributed without charge to appropriate users, the new software is compatible with Inventory Management System/II, previously announced for larger firms. It can also be used in conjunction with other applications of Honeywell's Management Information for Distributors (Midis) family of packages, a spokesman noted.

### Multi-File Matching Ability Added to Cullinane Systems

BOSTON — The report generator systems from Cullinane Corp. have been enhanced to include support for multiple file matching. "Any number of files can be input," a spokesman explained, provided the sum of all the record lengths does not exceed 8,100 bytes.

The new features does not affect special file-read routines and even a mix of conventional and unusual files can be handled in a single match run. The multi-file matching is available free to new users and to those who have acquired one of the Cullinane systems at current prices, the spokesman said. Cullinane is at One Boston Place, 02108.

### Com-Share Installs 'Faspl'

ANN ARBOR, Mich. — A conversational version of Faspl, a plotting software system capable of producing point, line, bar and step function graphics, is now available on Com-Sharc's time-sharing network.

The software interacts with the user through a series of decision prompts and simple inputs. It also accepts plot data input from fixed or free-form symbolic files, paper tapes and remote terminal keyboards. The firm is based at 2395 Huron Parkway, 48106.

### 'LIS' Eases Compiler Building

CLEVELAND — Compiler builders developing languages for several different CPUs can avoid inconsistent results and repetitious coding tasks by utilizing the Language Implementation System (LIS) package from Chi Corp.

LIS includes the parser, optimizer, language for the target machine, and the code generator. On the other hand, the syntax description, semantics generation routines, the scanner and the target machine description are written by the implementor or by Chi as a separate effort. The basic LIS is available from 11000 Cedar Ave., 44106.

By Don Leavitt  
Of the CW Staff

MAIDENHEAD, England — There is no coding method currently available for converting standard system flowcharts into job descriptions and that, according to H.J. Weegenaar of Centraal Beheer, is why Job Control languages are so poorly utilized today.

Writing in the latest *Infotech State of the Art Report* (No. 14), Weegenaar recognizes that almost all of the job control functions required by non-programming users can be found in existing JCLs. But, he adds, most JCL manuals are so involved in the detail of specific JCL entries they miss the overview the user so badly needs.

He cited lack of structuring around the main purposes of a JCL as one of the reasons for its poor applicability today. Other problems exist, he said, because JCLs are specified as low-level programming languages "rather like assembly," and JCLs are so complex that "only highly experienced programmers can understand them."

Weegenaar served on the original American National Standards ad hoc group that studied the feasibility and justification for standardizing JCLs across hardware lines.

In the current paper, he urged moving forward on the positive recommendations of the old study group, apparently writing before the announced reactivation of that group [CW, March 28].

He also noted that a Dutch group — of which he was also a member — has added useful definitions of the broad-brush job control functions that have been needed

in order to bring JCL down to the non-programmer user level. This group has, in addition, devised a function matrix to clarify the interaction of the functions with the operations and resources that have to be controlled by the JCL.

In Weegenaar's view, the simply structured JCL has three control functions. Declaration control permits — indeed requires — the name of the job, the start and stop points, and subdivision into sub-jobs to be specified. Execution control provides the interface between the computer operator and the operating system, to get the declared jobs done.

The allocation control function provides a means of specifying resources to be used and assigning symbolic device names and file names. It is this area in particular that needs improvement, the author suggests.

### Peripheral Descriptions

Current practice, he explained, requires

peripheral descriptions in each program provided through facilities of the programming language.

Execution sequence and run-time changes in devices can be controlled by the operator, but substantive changes require program revision. Improved JCL should relieve both areas of much work, Weegenaar said.

Even without knowledge of the renewed ANS study group, Weegenaar appeared generally optimistic. He noted that Ifip Working Group 2.1 has recommended establishment of a subcommittee on Operating Systems and Conversational Languages and a Working Conference on Command Languages organized by Ifip Technical Committee 2, is to be held in April 1974.

Infotech's 560-page Report No. 14 covers a broad range of topics related to operating systems, and is available for \$95 from Infotech, at Nicholson House, High St., here in Maidenhead.

## OS, Disks, Programs All Checked With Four-Way 'Monitor System'

OMAHA, Neb. — OS/360-370 users have still another means of measuring the effectiveness of their operations with the announced availability of the Monitor System package from Computer Software Inc.

The complete system is made up of four individual monitoring tools which can be used alone or together.

The Operating System Monitor (OSM) is

used to measure activity within IBM's OS. It has the advantage over other monitors, the vendor said, because it gives moment-by-moment reporting of activity, rather than average activity over time.

As its name implies, the OS DASD Monitor subsystem is used to monitor the seek activity of 2311, 2314, 2319 or 3330 disk packs. Data about as many as 99 units can be collected at one time.

The OS PDS/Monitor subsystem is designed to measure the efficiency of partitioned data set activity on a user's disk drives. This part of the package was written, the vendor explained, to find out why there is so much seeking within the SYS1.SVCLIB section of the operating system.

Finally, the OS Problem Program Monitor (PPM) reports the high CPU usage areas within a user's application program. Programs under study may be up to 400K bytes long, and several application programs can be monitored concurrently. The monitor runs in a separate region or partition from the subject programs and no JCL changes need to be made.

Several of the programs within these monitoring subsystems require as much as 80K bytes to operate but the normal memory load isn't much more than 20K. None of the systems modify IBM's OS coding.

The four-sided monitor system and miscellaneous supporting programs are available in object form for \$4,980. Source code is available for those users who wish to maintain or modify the system.

Computer Software is at 3242 Pedersen Drive, 68144.

## Payables Package Runs in 128K

LOS ANGELES — 360/370 users can begin to move toward a fully integrated management accounting and information system with the installation of an accounts payable package from Unicorn Systems Co.

Related packages to handle general ledger, accounts receivable and other aspects of a company's financial status should be available later this year, the company said.

The Payables system supports cash requirements forecasting, single-entry for recurring vouchers, voucher balancing, and calculation of vendor discounts, as well as discount allocation and the handling of vendor credit memos.

It also aids in payable forecasting and aging of past due accounts, and special treatment, if required, for permanent and transient vendors.

Check-writing cycles are dynamically user-controlled and include check registers, payment registers and year-end 1099 forms in addition to the checks themselves. The system also works with multi-

ple payees and non-pay vouchers.

To keep management aware of things to come, the software produces a planned expenditure report. But it also generates an outstanding purchase order report and all appropriate general ledger and job cost journals, adjusted journals and work sheets so that a company knows where it has been.

Once shaped to the user's needs, the package includes comprehensive, multi-level diagnostic analysis and reporting features, tempered with error correction and default options to cope with many of the obvious types of errors that can creep into the input data.

Written in ANSI Cobol, the system is operational on 360s and 370s with minimum available partitions of 128K bytes, under DOS, OS or virtual storage.

The system can be leased on a licensing basis for up to five years. Cost will be between \$5,000 and \$10,000, depending on options required, a spokesman said.

The firm is at 3807 Wilshire Blvd., 90010.

# For MMS General Ledger Users 1973 Will Be A Vintage Year.

Since January, 20 companies ordered the MMS General Ledger System. Each one of these corporations is worth more than \$20 million (one is in the \$800 million class). They all have the programming staffs and resources necessary to develop their own corporate financial systems. Instead, they chose the MMS General Ledger. A software package.

Their reasoning is simple: it costs less to use a proven package (more than 65 users have installed it in the past three years). Also, it fits your needs rather than the other way around.

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## Tapes Save Core, Time

ST. LOUIS — Users who feel disk-based files are best for every application should probably look at what McDonnell Douglas Automation Co. has done in developing version II of its Automated Shareholder Record System (ASRS-II).

ASRS handles most aspects of the processing of stockholder records, including payment of dividends, withholding of taxes and mailing of notices, proxies and annual reports. By changing master file storage from disk to tape, the vendor claims to have cut processing time under ASRS-II by up to 50%, and core requirements by as much as 20%.

### Records Merged

Records to be updated are temporarily loaded from tape to Isam-type disk files, a spokesman admitted, but after processing, the updated records are merged back into the tape masters for storage.

The minimum hardware configuration required to run ASRS-II is an IBM 360/40 with 160K bytes of available core, three 9-track tape drives and one 2314 or 3330 disk facility. The system functions in an OS environment.

### Source Codes

ASRS-II costs \$30,000 which includes ANS Cobol source code, documentation and 20 man-days of system support, which can include consultation, training, procedural development, management orientation or program modification to fit user needs.

Interfacing with the basic system but available separately are a stock transfer module for \$6,000; a module for printing checks and tax statements at the same time for \$5,000; and a dividend reinvestment module for \$1,500.

McDonnell Douglas Automation Co. is at Box 516, 63166.

## 'Simsnips' Debuts

LOS ANGELES — *Simsnips*, a free newsletter published quarterly by Consolidated Analysis Centers, Inc. (Caci), features three- or four-line descriptions of simulation models under development.

"Subscription" requests or copy for the newsletter should be addressed to J.S. Annino at Caci, Suite 350, 12011 San Vicente Blvd., 90049.

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## IEEE Meeting Hears

# Software Reliability Can Be Modeled

By Levi J. Carey

Special to Computerworld

NEW YORK — Practical tools and techniques to insure improved software quality are clearly needed, but progress is being made in meeting that need, Dr. Milton J. Minncman said in keynoting the recent IEEE Symposium on Computer Software Reliability.

The bulk of the presentations in this year's symposium, held earlier this month, centered around creation of workable reliability models and the test and development tools needed for their support.

Mathematical models can be devised to forecast how reliable a software system will be, several researchers agreed, but what factors should be in these models was not part of their agreement.

Other tools, techniques, data and solutions representing what some observers consider significant steps toward improved software reliability were spread throughout the 26 papers and many discussions that accented the three-day meeting.

Magnitude of the reliability problem was dramatically demonstrated by S. Bloom of Bell Laboratories who pointed out that for the Bell System's No. 1 Electronic Switching System, with more than five million instructions, software quality assurance administration alone required an annual budget of \$750,000.

This did not include original programming costs, test designing costs or supporting activities for executing quality assurance procedures, Bloom noted.

Programming productivity of 10,000 lines of source code per man-year in the development of large, nearly error-free programs is not only possible, but also practical, according to Harlen D. Mills of IBM, a long-time exponent of improved programming methodology.

### Programmer Power

Language design can encourage programmers to write good programs, but some programmers can achieve good style — good use of a language's features — even when they have to work with poor languages, B.W. Kernighan of Bell Labs told the same session on methodology. Actual programs illustrated each point as he made them.

## Merchants Use IUP To Track Products

WHITE PLAINS, N.Y. — Large-scale retailers can coordinate all their operations around a single on-line integrated data base with the Twin Fair Merchandise Processing System, scheduled to be available from IBM in August. The program functions as an application under IBM's Customer Information Control System (CICS).

An Installed User Program (IUP), the software controls many of the major resources of the retailer, including stores, warehouses and distribution centers and its inventories and capital. It utilizes IBM 3270 information display systems as I/O devices for a centralized 370.

Developed originally by Twin Fair, Inc., Buffalo, N.Y., this IUP accepts order entry information, then tracks incoming merchandise through the receiving process at the warehouse, distribution center and store levels. It also supports the accounts receivable function.

Written in Cobol and Assembler, the package will operate under CICS on a DOS-oriented 370 with 128K bytes of main memory available. As an IUP rather than an IBM-developed Program Product, this software has minimal, newsletter-type support for error correction.

It will be available by the end of the summer under a license agreement for \$1,750/mo. These charges are waived after the first 12 consecutive months of payments.

Startling to some who had been to last year's symposium was the total absence of papers on software programming proofs — an analytical approach to proving software correctness by analysis that was widely discussed in 1972. This probably stems — one observer suggested — from the fact that this method has only been found applicable to small programs (up to 300 instructions).

In summary, the symposium produced a feeling that software reliability is coming of age — the use of the term "reliability" expresses a confidence that was lacking when people simply spoke of "quality assurance." The models are beginning to look plausible and the test measurement tools now have utility. Further, progress is being made in understanding the art of programming so that performance can be drastically improved.

Copies of the proceedings are available from IEEE, 345 E. 47th St., 10017.

*Carey is president of Computer Software Analysts, Inc., a Los Angeles-based firm working in the development of automated tools for verifying the operational quality of software.*

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# COMMUNICATIONS

## Data Briefs

### 1,200 Bit/Sec Unit Added To Collins Modem Family

NEWPORT BEACH, Calif. — Collins Radio Co. has added a 1,200 bit/sec unit to its line of data modems.

The TE-1200 is a frequency-shift-keyed (FSK) modulator-demodulator that accepts digital data from the terminal equipment and converts it to frequency shift-keyed audio tones for transmission over telephone circuits.

The TE-1200 provides asynchronous data transmissions over dial circuits or unconditioned 3002-type circuits. It is compatible with the Western Electric 202C, D and E.

The TE-1200 includes built-in test features that can be used to isolate faults to the modem itself or the data terminal equipment.

The standard TE-1200 costs \$475, with quantity discounts available. Delivery will be from stock from Mail Station 503-110, 4311 Jamboree Road, 92663.

### Adds 9,600 Bit/Sec CRT Replaces Teletypewriters

HAUPPAUGE, N.Y. — Applied Digital Data Systems Inc. (Add) is offering a Teletype-compatible CRT display terminal.

The Consul 580 displays 24 lines of data with 80 char./line.

Standard equipment includes cursor controls, scrolling, a printer interface and transmission speeds up to 9,600 bit/sec.

Prices for the Consul 580 start at \$1,795.

Delivery is 60 days from 100 Marcus Blvd., 11787.

### Calculator-Type Keyboard Added to Univac DCT Units

SANTA MONICA, Calif. — A desk calculator-style keyboard designed to operate with the Univac DCT 500 and DCT 1000 remote data terminals is available from TTS.

The ANK-16U operates on-line or in local mode at whatever speed the terminal is set to operate.

Carriage return, line feed, comma, period (decimal), minus and space keys are normally included.

The unit is priced at \$150 from 2928 Nebraska Ave., 90404.

### 7K Storage Model Added to Sycor Terminal

ANN ARBOR, Mich. — Sycor's Model 340 intelligent communications terminals are now available with up to 7K bytes of programmable memory.

The lease price of the Sycor terminals with the 7K memory option will be \$83/mo including maintenance on a one-year lease. Purchase price is \$2,400 from 100 Phoenix Drive, 48104.

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Gerard W. Schoenwald, Director of Marketing



### 'Conscious Effort'

## Johnson Claims FCC Stifles News Flow

The seven-year term of FCC Commissioner Nicholas Johnson expires in June. Johnson has been one of the most outspoken members of the FCC and has often been cast in the role of the dissenting minority in major FCC decisions. In this interview, he explains his views about the commission.

By Ronald A. Frank  
Of the CW Staff

WASHINGTON, D.C. — "There is an affirmative effort [on the part of government agencies] to keep information from the public," according to Nicholas Johnson, commissioner of the Federal Communications Commission.

"A government agency has a responsibility to inform the public, but in an age when these agencies tend to be run as subsidiaries of large corporations perhaps it is asking too much to have them rat on themselves," Johnson said.

Speaking specifically about the FCC, Johnson said, "Major decisions involving the Bell Telephone companies have been released on Thanksgiving eve, on Christmas Eve, Nicholas Johnson and a recent one prior to Mother's Day."

"It is pretty hard to believe that this is not a conscious effort, when major anti-consumer items are deliberately released on late Friday afternoons, knowing everyone is gone for the weekend and the only coverage will be in the thin Saturday papers."

"The best quality general newspapers in the country simply do not cover the FCC regularly with the degree of time and attention that the trade press does. There's a scandal a day here to be uncovered if there was only a reporter here to write about it," he said.

#### 'Less Hesitant' Users

Asked whether greater user participation in regulatory issues would help, Johnson said these groups should be "less hesitant" about speaking out. "The more participants there are the better it is," he said.

"Out of a diversity of interests that represents the American business community comes the best possible public policy," he said.

But he cautioned that "problems arise when you tend to have disproportionate influence. Generally an agency like the FCC tends to give priority to the interests of the most powerful industries first."

"In this regard the commission is no different from other government agencies like the executive branch agencies such as we have seen in the recent Watergate scandal," Johnson said.

Recognizing that he was not painting a very rosy picture, Johnson said he was

merely trying to be "candid and honest."

#### FCC Liberalizing?

Asked whether he believed that decisions such as Carterfone had established a more liberal FCC trend, Johnson said, "We don't sit at the commission and decide what the next trend is going to be, we decide one case at a time. Sometimes you can get the votes, and sometimes you can't."

Elaborating on Johnson's statement, Bob Thorpe, the commissioner's assistant said, "You can look at Carterfone, at the specialized common carrier decision and those kinds of cases and say some progress did take place."

"But the first MCI decision was a four to three vote and that is the closest [to a

no vote] that you can get," Thorpe continued.

Asked if he could predict how long it would take the FCC to resolve an issue like the application of Packet Communications, Inc. for a packet-switched data network, Thorpe said, "It depends how the forces line up. It looks like Bell will line up in favor of PCI and that will be a big help."

Johnson said he did not want to speculate on the most important FCC decisions that had been handed down during this term on the commission. Asked if there was any possibility of him being renominated for another seven-year term, the commissioner said, "There is less likelihood of my being reappointed than there is of Richard Nixon being impeached."

## In-House Consultant Role Seen Complex, Changeable for Manager

BOSTON — The role of the data communications manager is complex and subject to frequent changes.

This was the conclusion of several seminar sessions at the annual International Communications Association (ICA) conference that explored the proper way to manage a company's communications facilities.

The data communications manager must have the "unqualified support of the executive suite" in order to be successful within his company, according to Richard A. Kuehn of RAK Associates, a consulting firm. "Today, communications is more than a bill from the carrier or [for] equipment. It is the movement of information," Kuehn told the users.

Urging users to be "the most sophisticated of system analysts," Kuehn said the manager must be the "wisest of seers in order to foretell and meet the changes of both the marketplace and his environment.

"By being privy to long-range corporate planning, having effective alternate solutions with recommendations available before the questions are asked, and maintaining a large profile, most problems will never arise," he said. To implement this type of approach, the manager becomes an "in-house consultant," he added.

The rise of competition in both the communications carrier and equipment areas has made it virtually impossible for the communications manager to depend on anyone for valid input on the operation and capability of available equipment. Most sales personnel are paid on commission so their interest is in having the user switch to their equipment, Kuehn implied.

He also chastised the "disconnect salesman" or percentage-of-savings consultants who he said often work "hand in glove"

with the salesman. To counteract this situation, the attendees were urged to keep abreast of new developments through trade journals and user organizations.

#### Know Regulatory Affairs

The attendees were also advised to be more involved with regulatory affairs. Business provides "over 50% of the carriers' revenue" but is virtually nonexistent in rate case proceedings, he said. But to ignore applications for rate increases can be very expensive for the user if higher charges are approved.

At the very least, Kuehn suggested that users write letters to the proper regulatory commission to make their positions known. He also urged organizations such as ICA to become "active intervenors" in regulatory affairs.

ICA members attending a seminar on the responsibilities of the communications manager said the equipment controlled by their departments varies from company to company. One manager said he controls all equipment up to the modem, after which the DP manager has responsibility for the equipment up to the mainframe.

Another user said his authority went past the modem and included everything up to the communications front end or line controller.

A third user said his communications responsibility included only the line facilities supplied by the phone company and all equipment was selected and controlled by the DP department.

But most users agreed that regardless of the interface point, the implementation of an effective communications network requires close cooperation between the communications and DP departments.

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## Most Set for Service Soon

# Specialized Carriers Begin to Interconnect Networks

By Ronald A. Frank  
Of the CW Staff

BOSTON — Two of the specialized common carriers have agreed to standardize their transmission protocols so users can be served by both networks.

The agreement between United Video, Inc. and CPI Communications could be the start of a third interconnected specialized carrier network comprised of the smaller firms which plan to provide data and other services to users [CW, April 25].

Most of the specialized carriers were represented at the recent International Communications Association conference here, and prospective users did not have to look far to get quotes on proposed rates and services.

In addition to its agreement with United Video, CPI said it will utilize facilities at the Dallas domestic satellite earth station being planned by American Satellite

Corp.

Such a lineup would take CPI out of the regional specialized carrier category and allow the company to provide service to other portions of the country.

American Satellite said it had signed agreements to lease up to four transponders, each of which has a capacity of 480 full-duplex voice-grade circuits, on the Canadian Anik 2 satellite. The firm expects to begin domestic operations by "late fall" of 1973 with earth stations at New York, Chicago, Dallas and Los Angeles.

Initial rates for a New York-to-Los Angeles voice-grade channel will cost \$1,200, exclusive of local loops, the company said.

Satellite transmission apparently is also being considered by Data Transmission Co. (Datran). At least one network configuration being shown by Datran officials at the ICA conference did not in-

clude a terrestrial link between the West Coast and Texas portions of the firm's system.

The company is considering other technologies to implement this expensive portion of the network, a Datran spokesman said. If Datran decides to use satellite facilities, it would have to lease those facilities from outside suppliers since the firm has not applied with the FCC for its own satellite system. And if the ground-based link is not built, the construction permits for that portion of the network would go unused.

CPI said it would interconnect with United Video in Dallas, where it would also share earth station facilities with American Satellite. CPI said it planned to charge about \$1/mile/mo for a "Telpak-type circuit" compared with \$1.25/mile now being charged by Southwest Bell on intrastate routes within Texas.

A voice-grade line will cost about \$2/

mile/mo for full-duplex service compared with \$3.30 from Southwest Bell, a CPI spokesman said. The firm expects to begin data service before the end of the year.

Southern Pacific Communications Corp. said it plans to file an intrastate tariff in California by the end of May at a proposed rate of 95 cents/mile/mo for a voice-grade full-duplex channel. Interstate rates will probably be the same, a spokesman said. Southern Pacific plans to hook up its first data customer in late summer of this year.

United Video plans to offer three-year operating-type lease plans to users. One-, two- and three-year lease plans will be available, each providing prospective users with a 10% additional discount compared with month-to-month agreements.

A customer signing up for the full three years would receive a 30% discount on his monthly rates for a 4kHz channel, a spokesman said. A proposed charge between New York and Dallas would be \$890/mo for a voice-grade channel and \$630/mo for the same facilities under the three-year agreement. This would not include local loops.

United Video also announced that a former communications manager for one of the largest networks in the country, American Express, will become vice-president for operations.

Herbert Granger, past president of the ICA, will be responsible for the United Video facilities between New York and Dallas.

Nebraska Consolidated Communications Corp., which calls itself N-Triple-C, said it is ready to begin data service between Omaha and Chicago within several weeks.

The company plans to charge about 80 cents/mile/mo for a 4kHz channel. An additional termination charge per channel end of \$5 will be included in the N-Triple-C rates. The firm presently operates a microwave system for the State of Nebraska.

## Interdata Expands Model 50 Processor Into Message Switch

OCEANPORT, N.J. — Interdata, Inc. has unveiled a store-and-forward message-switching system, the MS-5.

A typical system configuration includes the Interdata Model 50 communications processor with 32K bytes of directly addressable core memory, 5M-byte on-line disk storage subsystem, magnetic tape unit, card reader, TTY and a 30-line telecommunications subsystem module.

This configuration forms a turnkey system operating under the Real-Time Telecommunications Executive (RTEX), which acts as the operating system intermediary between hardware and application-level software.

### Good Mix?

This hardware-software mix offers users capabilities for receipt and transmission of messages, station identification, routing retrieval and code conversion and management of message traffic — including store-and-forward capability for a network of remote terminals, the firm's spokesman said.

The MS-5 system is designed to operate either as a free-standing switching center running the network of remote terminals or, alternatively, as part of a network controlled by several regional message-switching systems with computer-to-computer communications.

In the later application, control of the network can be shifted from one region message-switching system to another as traffic requirements dictate.

A typical system costs about \$190,000 from 2 Crescent Place, 07757.

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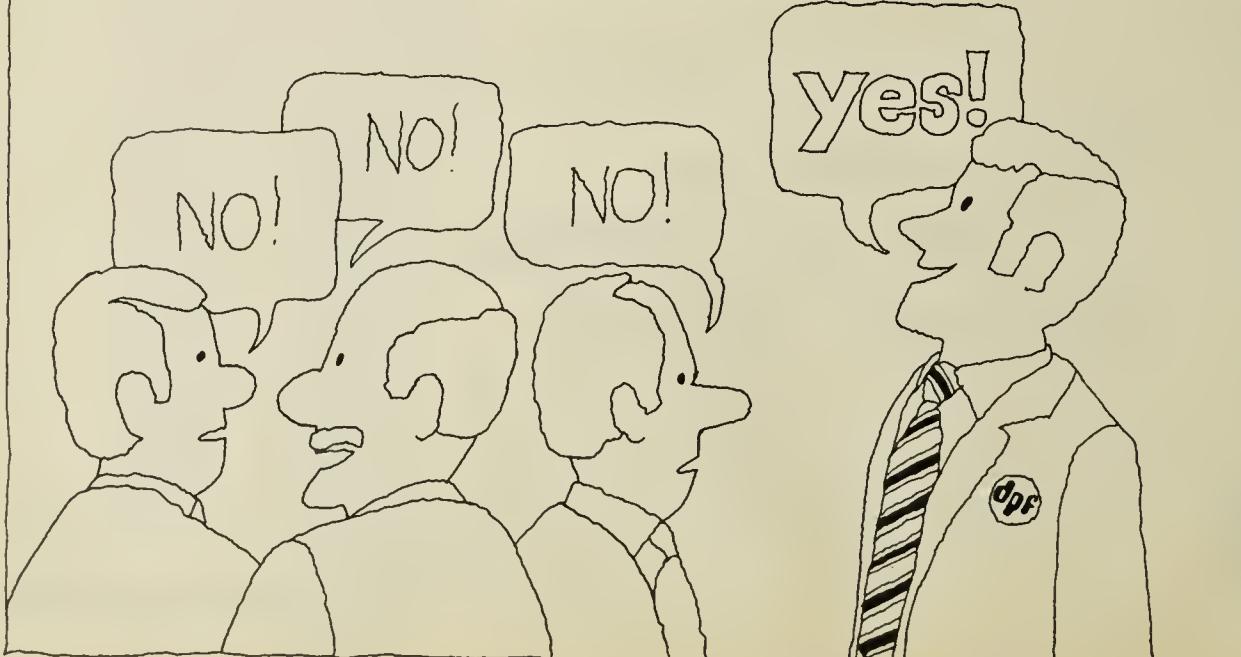


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## Bits & Pieces

### Minis Get Floppy Disk, Stores 262K Char./Drive

PALO ALTO, Calif. — A floppy disk storage system is being offered to mini-computer users by Advanced Electronics Design, Inc.

The disk subsystem comes complete with one drive, controller electronics, computer interface and software package.

Storage capacity is 262K char./drive with a transfer rate of 31K char./sec.

Price is around \$3,000 for a one drive system with optional extra drives at \$1,000 each from the firm at 3197 Park Blvd., 94306.

### Smart Mod II Add-On Memory Relaces Core on Large 360s

FORT LAUDERDALE, Fla. — Users of IBM/360 Models 65, 67 and 75 can have 8M bytes of core memory from Standard Memories, Inc. (SMI) for less cost than 1M byte of core memory from IBM, a company spokesman said.

The savings is realized through SMI's recently announced Smart Model 2365 Mod II plug-to-plug maincore memory expansion — a reworked version of the firm's Smart 2365 Mod I.

Purchase price for the maximum SMI configuration is \$1,384,000, which compares to the IBM purchase price for 1M byte of around \$1,500,000, the spokesman said. One megabyte of SMI core memory costs \$190,000.

Rental plans are also available with 8M bytes renting for \$16,000/mo on a two-year lease from 2801 E. Oakland Park Blvd., 33306.

### More Core for PDP-8s and PDP-11s

MINNEAPOLIS — PDP-8 and PDP-11 minicomputer users can obtain add-on core memory for their systems from Fabri-Tek.

The Model 8 is designed to provide PDP-8 users the ability to add 24K words to their present memory storage.

Model 11 adds 8K to 128K words to PDP-11 minicomputers. Cost depends on the size and model used with prices ranging up to 35% less than comparable core memory from Digital Equipment, according to the firm located at 4010 W. 65th St., 55435.

### Verifier/Editor Adds Options

NORRISTOWN, Pa. — Two product enhancements — addition of 51-column and 600-card/min equipment options — are available for the Verimatic 70 automatic verifier/editor.

These options will be made available with the Verimatic 70's existing 80-column, 300 card/min capability of the current model.

Purchase price of the unit is \$14,850 with a rental cost of \$395, exclusive of maintenance from 203 E. Main St., 19401.

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90% Tout Performance

## Survey Indicates Non-IBM Disk Users Happy

MOORESTOWN, N.J. — Nine out of 10 users of IBM-compatible disk drives rate the overall performance of these devices as "good" or "excellent" and better than eight out of 10 users assign similar high ratings to the drives' reliability and the vendors' maintenance service, according to a user survey conducted by Datapro Research Corp.

The survey covered 145 users with a total of 1,743 non-IBM drives installed. Each user was asked to rate his equipment on overall performance, ease of operation, hardware reliability and maintenance services.

A synopsis of their findings is shown in the chart.

Figures in the chart represent the composite rating of 26 disk subsystems from 11 separate vendors: Calcomp, Memorex, Mohawk, Potter, Singer, Telex, Tracor, Ampex, Control Data, IBM and Peripherals General.

Other results in the Datapro survey indicate that 19% of the respondents en-

	Excellent	Good	Fair	Poor
Overall Performance	56%	34%	10%	0%
Ease Of Operation	69%	30%	1%	0%
Hardware Reliability	48%	34%	13%	5%
Maintenance Service	51%	32%	10%	7%

Users evaluate non-IBM disk equipment. countered difficulties during the installation of their IBM-compatible disk drives, and that 25% have encountered difficulties in diagnosing problems and obtaining service. Also 8% of the users expressed specific complaints about a lack of trained maintenance personnel.

Conversely, little evidence was found of the widely feared problem of "finger pointing" between independent and IBM personnel.

A full copy of the survey is presented in *All About Compatible Disk Drives*, a 20-page report for \$10 available from One Corporate Center, Route 38, 08057.

In addition to the survey, *All About Plug-Compatible Disk Drives* analyzes the pros and cons of acquiring disk equipment from sources other than IBM, presents the specifications of 31 subsystems from 11 vendors, and summarizes the results of the user survey.

### Replacement Plan

Included is a "three-point replacement plan" that offers views on what steps the user should take when investigating a source of disk subsystems.

The three major steps, according to the study, relate to evaluating the present system, determining the conversion costs and investigating the alternatives.

But the study does not claim to have any definitive answers and points out several variables users must always keep in mind.

The study is intended to act as a guide with the final decision, as always, resting with the user and his unique requirements.

## OEM Products

While equipment in this column is primarily for Original Equipment Manufacturers (OEMs), in most cases it is also available in single units to interested users. Further, while some of this equipment is not presently available to the end user, it does give some indication of techniques and products that may be incorporated into end-user equipment.

### Mini Offered at \$990

IRVINE, Calif. — Computer Automation has unveiled a new member of the firm's Naked Mini family: a 16-bit MOS/LSI minicomputer priced at \$990. This price is about 50% the previous price for the Naked Mini.

Also announced is a companion machine, the Alpha/LSI, which incorporates the new minicomputer in a covered chassis and includes power supply and a push button control console, at a price of \$1,990.

Both of these new offerings are upward compatible with previous Computer Automation hardware and software but feature an expanded instruction set.

The basis MOS/LSI minicomputer incorporates a seven-chip MOS processor, 4K words of memory and direct memory access (DMA) hardware on one printed circuit board.

This basic configuration can be expanded to a maximum of 256K words. Cycle time is 1.6  $\mu$ sec.

A full line of software including operating systems and language compilers is also available from the firm at 18651 Von Karman, 92664.

### Build Your Own Modular Mini

NATICK, Mass. — An LSI/MOS general-purpose do-it-yourself mini-computer system called the L-500 Series is available from Control Logic, Inc.

The minimum system — selling for around \$400 — consists of an 8-bit processor, I/O control and memory address buffer.

Other modules available include a 512 by 8-bit Prom, 256 by 8-bit RAM and a universal asynchronous receiver/transmitter. Packaging accessories, including pre-bussed card racks are available.

The L series system is expandable to 16K bytes of memory and can control display, keyboards, printers and act as the logic units for intelligent terminals.

Higher level software in the form of tapes, listings and preprogrammed Prom's is available at additional cost from Nine Tech Circle, 01760.

### ... Another Japanese Keyboard

SPOKANE, Wash. — Key Tronic Corp. has announced Kata Kana (Japanese character) keyboards.

The keyboards feature N-key rollover, selective repeat functions, and selective inhibit functions. Non- logically paired 10-bit output code in four modes with up to 90 coded keys is available.

Price is \$200 in quantities of one to 10 with this price dropping to \$95 each in 1,000 lots from the firm at Bldg. 14, Spokane Industrial Park, 99216.

### Quelling a Misconception

The correct price for a rack mounted CRT and keyboard unit — from Car-Mel Electronics, Inc. — is \$1,850, dropping to \$1,000 in 100 lots.

### 3M Unveils Cartridge Drive

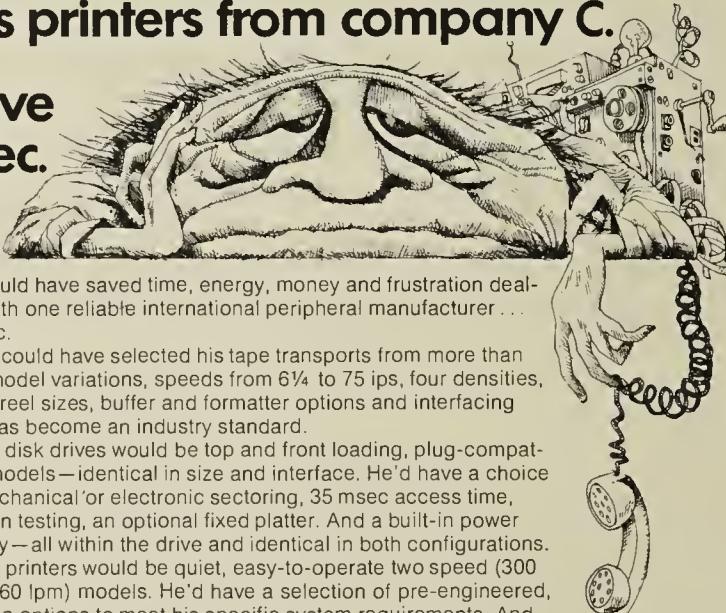
ST. PAUL, Minn. — 3M Co. has introduced a data cartridge drive for the Scotch brand DC300A data cartridge.

Available with one, two- or four-track read-while-write heads, the DCD-3 drive has 1,600 bit/in. recording density, 48K bit/sec transfer rate, 30 in./sec bidirectional read/write speed and 90 in./sec bidirectional shuttle speed.

In OEM quantities the DCD-3 with a single channel read-while-write head costs about \$330 from P.O. Box 33600, 55133.

**He bought his tape transports from company A.  
He bought his disk drives from company B.  
He bought his printers from company C.**

**He should have talked to Pertec.**



He could have saved time, energy, money and frustration dealing with one reliable international peripheral manufacturer ... Pertec.

He could have selected his tape transports from more than 400 model variations, speeds from 6 1/4 to 75 ips, four densities, three reel sizes, buffer and formatter options and interfacing that has become an industry standard.

His disk drives would be top and front loading, plug-compatible models — identical in size and interface. He'd have a choice of mechanical or electronic sectoring, 35 msec access time, margin testing, an optional fixed platter. And a built-in power supply — all within the drive and identical in both configurations.

His printers would be quiet, easy-to-operate two speed (300 and 160 lpm) models. He'd have a selection of pre-engineered, plug-in options to meet his specific system requirements. And features like electronic top-of-form, skip-over perforation, and full fault protection.

He'd have personal and professional assistance in the design, development and maintenance of his system. Factory training for his service people. Back-up by a service and support network in 30 U.S. cities and 20 foreign countries.

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# Off-Line Print/Plot System Designed for Large Users

CUPERTINO, Calif. — Three off-line electrostatic printer/plotter systems designed primarily for users of large computer systems have been introduced by Versatec Inc.

The matrix print/plot systems, known as Mapps, are designed for use with IBM-compatible tapes. They are stand-alone units which operate with any of Versatec's matrix hard-copy output devices.

Operationally, the Mapps controller accepts data from the tape and transmits it to the matrix unit after observing signal and timing requirements for the raster scan plotting and printing, the firm ex-

Mapps provides eight operational control functions and indicators located on the system control panel. Among these

are file select, permitting search and selectivity of any file or file group on the tape; and number of copies, which allows the user to have repetitive printing performed by the matrix unit on any file selected.

For plotting applications, the systems are available with a Fortran package called Versaplot.

To effect the actual printing and/or plotting this and other programs control the voltage applied to a stationary, linear array of conducting nibs in the matrix unit. These conducting nibs, when electrically charged, transfer the charge directly onto the surface of dielectrically coated paper.

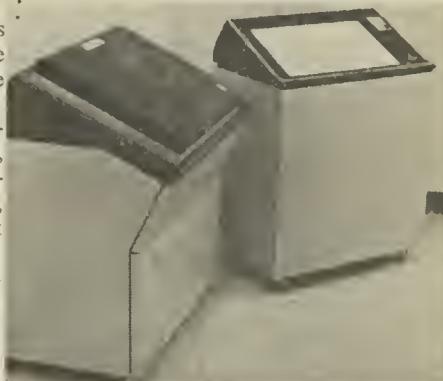
This charge is developed by a liquid toner to produce a visible dot. An incre-

mental paper drive stepper motor moves the paper the same vertical distance as the distance between any two nibs on the horizontal axis.

This permits square aspect ratio plotting, a company spokesman said. Further, as each line of dots is printed independent of the previous or following lines, any error which occurs in one scan is not carried forward to successive scans.

Price for the 7- or 9-track NRZI configuration is \$8,500 and \$11,000 for the 9-track phase-encoded configuration.

Matrix units which operate with Mapps are priced separately, as are software packages for use with different computers. Versatec is at 10100 Bubb Road, 95014.



The Mapps Electrostatic Print/Plot System allows large system users to perform printing and plotting applications off-line.

## Add-On Replaces PDP-11 Memory

SUNNYVALE, Calif. — Advanced Memory Systems, Inc. (AMS) is offering PDP-11 users a series of plug-compatible solid-state memories designed specifically to replace the standard Digital Equipment Corp. memory on the PDP-11/15 and PDP-11/20.

Basic 4K or 8K by 16- or 18-bit memory boards have an associated driver/control/power supply board, incorporated into a fully compatible connector block.

System throughput can be enhanced up to 20% by the new AMS memories because of the higher speed of the monolithic add-ons — 375 nsec access time, 600 nsec cycle time (processor limited), a spokesman said.

Price for the units depends on size and number of add-ons ordered, from 1276 Hammerwood Ave., 94086.

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**United Video, Inc.**, is a new and important entry in the specialized common carrier field. We will provide a competitive alternative to standard telephone service for point-to-point direct line voice and data communications throughout much of the United States. As such, we offer major operating and economic benefits to communications users who in the past have had to take standard Bell direct communications service or leave it.

**United Video** is not a newcomer to the communications field. For a number of years we've carried television signals for CATV franchises in cooperation with our parent organization, LVO Cable, and are making arrangements to provide transmission services for network television signals in a major southeastern routing. All told, the company currently operates 1300 miles of microwave routes, and has filed applications with the FCC for an additional 5000 miles.

**At the same time**, we've been constructing a 700-mile Dallas to St. Louis data transmission network utilizing the most advanced microwave technology which is scheduled for service in Fall, 1973. This network will form the basis for the company's communications capability through much of Mid-America. Application for additional routes has also

been filed. This specialized common carrier service is designed both for companies located in the midwest and south and for those in other regions of the country wishing "pass along" services on message traffic going from coast to coast.

**In offering these services**, United Video looks to best the competition, old and new, in two key areas: 1) **cost** — For long term users standard UVI tariffs will be approximately 30% below the recently filed new Bell tariff and only half of the current Bell charge — and 2) **responsiveness** — unlike the telephone company, the direct line user will be our primary revenue source and we aim to do everything possible in our power to make sure he's getting premium, trouble-free service.

**Our abilities to deliver** in these key areas are among the reasons why we think you'll want to take a closer look at this new alternative to your present approach to direct line service. There are more, but these should give you the general idea. For further information on United Video's capability in data and voice communications, call collect to (918) 587-1171 or write: United Video, Inc. Attn: Marketing Department, P.O. Box 2686, Tulsa, Oklahoma 74101.



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(918) 587-1171  
An LVO Cable Company

## No More Paper, No More Books

# Insurance Firm Saves \$200,000/Yr by Moving to COM

**DETROIT** — The Automobile Club of Michigan and its sister organization, the Detroit Automobile Inter-Insurance Exchange, expect to save \$200,000/yr by replacing a conventional hardcopy computer output filing system with a computer output microfilm (COM) system.

The COM system controls the micro-filming, filing and retrieval of individual policy-related documents which were formerly handled by conventional computer printout. Previously this printout was hand-filed and retrieved in hard-copy form from a huge central folder file.

Now when a new automobile insurance policy is written or an existing one renewed, the computer system still prints the appropriate document.

Computer runs print about 11,000 of these documents per day. But here similarity to the old method ends, for as the hard copy is being printed, the same document is stored on a magnetic disk for

formatting, David Henning, systems analyst for the firm, said.

The COM records are then sorted by policy number. Subsequent programs write the sorted images onto COM-compatible magnetic tape for processing and update the microfilm index file.

The COM tapes are forwarded daily to an independent service bureau serving AAA, where microfiche is produced containing 42X reduction micro images of the original documents.

The daily total of 11,000 documents is contained on 16 fiche; each fiche contains a maximum of 777 documents.

In addition to the original fiche, 14 diazo copies are made. The magnetic tapes and fiche are transported to and from the service bureau (Computer Micro Service) by AAA trucks on their regularly scheduled runs.

Duplicate copies of the completed fiche are distributed to 13 clerical units within

the Collections Department and the Member and Policyholder Service Department. The original goes into a permanent central file and one duplicate copy is saved in a remote vault for fire protection.

Each clerical unit keeps a complete fiche file for one year. The file consists of a desk-top card tray. There is no merging required, Henning said.

"Each day's microfiche is placed in the tray behind the preceding day. As the new fiche is added, the fiche for the same day of the prior year is discarded from the front of the tray," he added.

Prior to the COM system the 11,000 forms were burst, sorted and hand-filed into one million policy folders.

These folder files were housed in open racks covering the entire tenth floor of the company's downtown headquarters. In that environment, Henning stated, nine days were required after printing before any document could be found in a folder

for referencing.

The yearly savings with the COM system are estimated at around \$200,000 in materials and clerical costs alone. Additional benefits are the major reduction in space allocation and an overall improvement in the availability of data and the efficiency of referencing, Henning said.

## Four Units Unveiled For Microfiche Users

**SAN DIEGO** — Stromberg Datagraphix, Inc., a subsidiary of General Dynamics, has announced four new products including a duplicator, film processor and microfiche viewers.

Free-standing and moveable, the Model 73 Duplicator accepts 105mm master microfiche and produces copies at a throughput rate up to 1,000/hr.

Producing cut-card duplicates, the same size as the master and with no waste, the duplicator can be loaded with a second master microfiche while the first one is being duplicated. Duplicates are the same size as the master and no film is wasted, a spokesman said. Cost is \$14,000.

The Model 155 Film Processor, designed for non-reversal processing, can handle 16mm, 35mm and 105mm silver halide film. Cost is \$6,750.

### 4-Inch Microfiche

The Model 1401 Microfiche Viewer accepts 4-inch microfiche up to 12 inches long. Included as standard are a non-glare acrylic screen and blowback magnification. An optional extended screen is available. Cost is \$195.

The Model 1451, an expanded version of the 1401, accepts a single 12-inch fiche or two 6-inch fiche. It also has a larger screen-size, capable of displaying an image 7% larger than the original document. Cost is \$295.

Standard lease is available for all four products. The firm is at P.O. Box 2449, 92112.



## Element-ary

A Harris Fototronic-CRT electronic typesetter, processing camera-ready copy at the rate of 4 page/min, produced the 12-pound, 1,700-page "CRC Atlas of Spectral Data and Physical Constants for Organic Compounds."

### Data Tablet Uses Stylus, Cursor

**FAIRFIELD**, Conn. — Scriptographics has unveiled, primarily for the OEM user, a data tablet, usable with both inking stylus and free cursor.

Features include a resolution of  $\pm 0.005$  in. (100 line/in.).

Coding is either in binary or BCD with the data tablet generating absolute coordinates in both point and stream modes at repetition rates variable up to 200 coordinate pair/sec.

Priced at \$2,000 in small quantities, special discounts are offered to OEM buyers from 398 Kings Highway, 06430.



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Computer Leasing Company handles all the details for you. We guarantee (and pay for) continued IBM maintenance. Insurance, too. We deliver and install in two weeks. Not months, weeks.

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# Here's good news for DOS 360/370 users!

## GRASP - the other half of your operating system.



**GRASP** is the most effective DOS systems software available today. It's providing dramatic dollar savings to over a thousand installations around the world. Here are some of the reasons why.

**WRAPAROUND SPOOLING:** Faster than IBM spooling and much easier to install and operate. Requires much less core and disk space.

**COMPLETE JOB ACCOUNTING:** Consumes about one percent of CPU time for accounting. IBM's uses about ten percent. Statistics collected are far more meaningful and comprehensive.

**SELF-RELOCATABILITY:** One copy of all programs means reduced maintenance costs, reduced disk requirements

for libraries. Speeds execution of overlaid programs—like SORT.

**PARTITION BALANCING:** A completely transparent priority dispatcher that increases throughput 8 to 12 percent per partition.

**FOURTH PARTITION:** Adds a complete, storage protected partition for GRASP's residence. IBM spooling takes one of DOS' partitions.

**AUTOMATIC VOLUME RECOGNITION:** More usability for tapes and disk. More fluid multi-programming.

**RESIDENT TRANSIENTS:** Especially for the ISAM user, phenomenal reductions in run times.

**PCI FETCH—CATALOGUED PROCEDURES—TAPE SPOOLING**—are among many more time and dollar saving features of GRASP.

**GRASP** can be installed in just 15 minutes, with no change to existing programs or procedures. The savings start immediately.

**GRASP** is a product of Software Design, Inc., the performance leaders in DOS systems software, and supported by a worldwide organization of specialists whose only business is DOS systems software. Send for your GRASP button today, and the other half of your operating system.

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230 Exhibitors Estimated

# Peripheral Products, OEM Gear Set for NCC Viewing

By Edward J. Bride  
Of the CW Staff

NEW YORK — "We plan to introduce a revolutionary new minicomputer. No details at present."

"Nothing new."

"...for process control applications and ??"

These comments highlight the range of "newness" and applicability to be found in the products on display at the National Computer Conference and Exposition (NCC), which opens here June 4 at the New York Coliseum.

Nearly 100 of the estimated 230 exhibitors replied to a questionnaire from the American Federation of Information Processing Societies (Afips), sponsor of the annual conference.

Many of the remaining companies were known to be plan-

ning new product announcements, and thus were hesitant to disclose any particulars on the Afips questionnaire.

The exhibit guide is more closely guarded until the opening of the show, Afips noted.

Besides the replies listed above, other companies claimed to be

**NCC  
1973**

"introducing" products announced in April or May.

## All Type of Products

Virtually every corner of the computer industry will be represented in the NCC exhibit hall, including hardware, software, services, publications and personnel development/education

facilities.

The mainframers, noticeably absent since RCA sang its swan song (Spring Joint Computer Conference, 1971), have returned. While complete details were not available, IBM, Control Data Corp., Digital Equipment Corp. and other "large mini makers" were listed in Afips materials.

As in the recent past, communications devices, terminals and modems, and peripherals for other equipment manufacturers will be prevalent.

Add-on and replacement memory makers are fewer in number, but users who might be interested in their gear have increased: independent memory is now available for many minicomputers and for large mainframes other than IBM.

The most generally applicable description of products being exhibited probably comes from a key-disk maker, which replied in the Afips questionnaire: "No new products *per se*," but "a number of subtle improvements in software."

This approach has marked most product announcements in the past several Joint Computer Conferences, the semi-annual affairs that have been replaced by the NCC.

But the change in name has also provided an opportunity to play "word games." Many of the exhibiting companies are touting their exhibit as "first time at National Computer Con-

ference," an obvious truism.

But with all the problems of mass marketing taken into consideration, NCC does provide the year's largest exhibit of computer and related equipment, the "biggest computer show on earth," according to Afips.

While much is already "proven" in the field, and two-thirds of the gear is intended for

other computer-equipment manufacturers, users interested in seeing equipment that represents savings for already-installed systems will find much in the coliseum.

With the addition of a few mainframes on the floor and the opportunity to run benchmarks of some systems, the exhibit could take on added meaning.

## Is Computer Artistic?

NEW YORK — For those who think art and science are completely unrelated, a full day devoted to computer arts may help change their minds.

This special NCC program, in the Regent Room of the New York Hilton Hotel, Tuesday, June 5, consists of five sessions exploring the use of computers as they relate to the many art forms.

The first session, at 8:45 a.m., will explore the state of computer-generated music, and will include a live demonstration.

Another session will consist of a discussion among four editors, with the focus on "divergent opinions" on the interaction of computers with the arts, according to a conference announcement.

The computer arts program concludes in the evening, with a discussion and showing of computer-generated films.

## Exhibit Hours

NEW YORK — With an estimated 230 companies occupying 650 booths in the New York Coliseum, attendees will need a good portion of the 35 available hours to view the exhibits.

For those who prefer to "shop" after work, Monday will be the best day, as exhibit hours are noon to 8 p.m.

Tuesday-Thursday, the exhibits will be open 10 a.m. — 6 p.m.

Friday is the last chance, with hours from 9 a.m. to noon.

## Fees Outlined for Five-Day Show

NEW YORK — There are several different fee schedules applicable to various portions of the NCC. The simplest is the most widely used: exhibits-only.

To attend the exposition only, attendees pay \$15 for all five days and \$5 for a single day. Exhibitor guests pay nothing.

For the conference sessions, all attendees pay \$60 for the five days, with a single-day registration available for \$20; students pay \$5. A \$10 reduction was available to members of Afips' constituent societies, if those

members registered in advance.

Special activities slated for NCC week include the two luncheons, each priced at \$12. (Wednesday, the address will be by Dr. Lewis Branscomb, IBM vice-president; the Thursday speech is by Edward N. Cole, president of General Motors.)

There is also a special two-day seminar (June 7-8) on managing the impact of generalized data bases; this program is available only to full conference registrants, who must pay an additional \$40.

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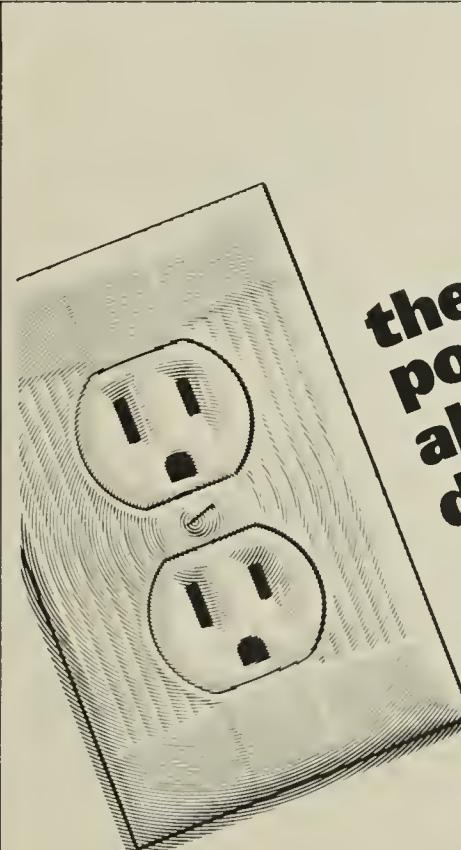
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For example, concurrent data entry and verification improves throughput. Full record display simplifies error detection and correction. System-generated messages assist operators. Processor logic and checks make sure only the choicest data gets to your computer.

Plus a full range of data entry functions: Virtual Program Control, Key-stroke Counting, Automatic Batch Transfer, Keystation Command Mode...and more. In addition, only Inforex Systems let you do file searching and update in place on both disc and tape.

You can get more than just data entry, too. Line and Serial Printing, fully formatted, On- and Off-Line Communications for local or remote locations, and advanced 1600 BPI Phase Encoded tape output for high performance tape transports.

No wonder Inforex has more key-to-disc systems installed than anyone else in the world.

No bones about it.

Choose system 1301, 1302, 1303 or In-Line Data Entry for the price/performance/backup mix that best meets your needs.

Inforex. The high performance feed company for your computers. Offices in major cities throughout the United States, Canada and Europe. Distributors world wide. Talk to us. Inforex, Inc., 21 North Avenue, Burlington, Mass. 01803.



**INFOREX**

## Data Disc Planning 'Colorful' Exhibit Of Graphic Displays

NEW YORK — Data Disc will show color CRT displays with its Anagraph graphic display system.

The Anagraph System, designed as a multiterminal clustered display system for IBM 360/370s includes: head-per-track disk memories, digital graphic displays and Bright Industries' IBM-

### NCC Terminals

compatible magnetic tape drives.

The built-in minicomputer of the Anagraph System features 16K bytes of memory and has an executive program called GOS (Graphic Operating System). The system operates either stand-alone or as an IBM 360/370 peripheral system emulating IBM 2260 or 3270 displays.

Data Disc will be at booths 1629, 1631 and 1633.

## Infoton Displays Vistar/GT CRT

NEW YORK — Infoton, Inc. will introduce a CRT display terminal known as the Vistar/GT.

Priced at \$1,595 the GT offers an 80-char. by 24-line screen presentation on a 12-in. rectangular monitor. Character generation is accomplished using a 5 by 7 dot matrix. Each unit contains a keyboard, control and refresh electronics, power supply and both an RS232C and current loop interface.

Switch-selectable data rates range from 75 to 9,600 bit/sec and an external setting allows a data rate of up to 18 kbit/sec with timing derived from an external TTL-compatible pulse source.

Infoton will be at booths 2027 and 2132.



Infoton Vistar/GT

## Information Displays Shows Computer Graphics System

NEW YORK — Information Displays, Inc. will exhibit its \$7,000 computer graphics system, the Idigraf.

Idigraf is a buffered, refreshed CRT for producing graphic displays with combinations of vectors and alphanumeric. The Idigraf has stroke-writing hardware character and vector generators, 17 in. CRT, MOS refresh memory, two intensity levels, blink and two character sizes.

Keyboards with hardwired programmable function keys (for hardware editing, text and graphics and cursor control), multiple monochromatic or color displays, light pens, 21 in. CRT, direct parallel computer or serial interfaces are among the optional features.

Information Displays will be at booth 2812.



Information Displays' Idigraf Graphic Display System.



Four-Phase Systems' System IV/40 Remote Intelligent Terminal

## Four-Phase Unit Makes Debut

NEW YORK — Four-Phase Systems, Inc. will give its System IV/40 remote intelligent terminal system its first public showing.

The IV/40 has 1,920-char. dual intensity displays, integrated cartridge disk drive and printer. It features a 72K byte LSI processing unit.

The system supports up to 16 video terminals and 16 printers. A typical system including three video terminals, 24K byte processor, 2.5M byte cartridge disk

drive and communications controller costs \$573/mo including maintenance.

Four Phase Systems will also show its System IV/70 intelligent terminal system at booth 1101.

### Mini-Based Graphics on Stage

NEW YORK — Imlac Corp. will be showing the PDS-1D graphics display system.

Standard features of the system include: 4K 16-bit word general-purpose mini-computer; 1.8 msec cycle time; display processor; CRT monitor; alphanumeric keyboard with additional function keys; asynchronous serial interface for either modem or teletypewriter unit; backplane wiring to allow an additional 4K of core memory; internal interrupt system; parallel interface and external interrupt; and escape character look-ahead which allows approximately 1,450 characters to be presented at 40 frame/sec on the display surface.

Imlac will be at booths 2822, 2824 and 2826.

# WE CROSSED AN WITH OUR INTELLIGENT GOT AN



## Warren G-V Displays Auto Calling Unit, Accepts BCD Code

NEW YORK — Warren G-V Communications will show its Automatic Telephone Line Connect System and its Bell 801-equivalent Automatic Calling Unit.

The two systems are designed to automatically dial a telephone number, answer at the called station, exchange acknowledgement signals and then transfer the telephone line to the user's equipment.

The ATLC system will operate over regular voice-grade telephone lines and can be used with terminal equipment that can provide a contact closure or EIA Logic to initiate the dialing sequence.

The Automatic Calling Unit will perform all functions of an ATLC control unit and will also accept BCD code and convert it to serial digits for dialing.

The ACU operates with standard data transmission units and will accept standard data verification tone from the modem at the called station.



Warren G-V Communications Automatic Line Control Unit

Warren G-V Communications will be at booth 2623.

## Medium-Speed Units Dominate

NEW YORK — Northern Telecom will display medium-speed (up to 9,600 bit/sec) data equipment.

STE, LRR and OLR units are full-duplex and data transparent, the firm said.

Logic 16 and 256 are combination data

## Cassette, TTY Come Together

NEW YORK — Western Union Data Services Co. will show its EDT 33 MSR, an integrated package of a Teletype Model 33 with a 120 char./sec magnetic tape cassette buffer.

The magnetic tape buffer interfaces with Bell System 103 modems for asynchronous speeds up to 30 char./sec or a Bell System 202 series data sets or equivalent for speeds up to 120 char./sec.

Data search can be performed manually or by stop codes, and a backspacing capability permits editing and error correction of data on tape during any local or remote mode of operation.

The EDT 33 MSR will be offered in two configurations: ASR and keyboard send and receive.

Excluding the modem, prices for the EDT 33 MSR are \$108/mo on a one-year lease for the KSR model and \$121/mo for the ASR model.

Western Union Data Services will be at booths 2806 and 2808.

## Multiplexer, Modems Share Codex Spotlight

NEW YORK — Codex will be displaying its line of data communications products, featuring the Codex Model 8000 Wideband Time Division Multiplexer. This TDM multiplexes up to 20 channels of synchronous data for wideband circuits of 40.8-, 48-, 50- and 56 kbit/sec.

Also featured is the Codex Voice-Grade

### NCC Communications

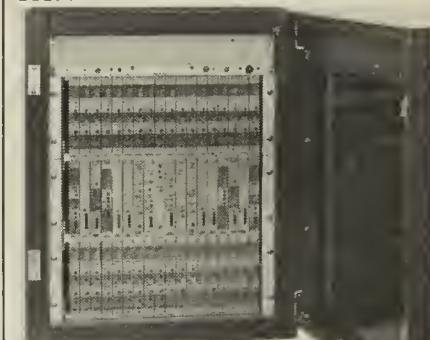
Communication System which utilizes the 296 bplexer. This system provides computer grade traffic at 19.2 kbit/sec over voice-grade lines.

Also shown at booths 2339 and 2438 will be the Codex 4800 Dial Modem, which provides 4,800 bit/sec transmission over dial-up circuits, and the Codex 9600 Dial Modem.

## General Datacomm Features Data Line

NEW YORK — General Datacomm will feature its line of data communications equipment at the NCC including: 1202 series frequency division multiplexers; 1300 series speech-plus terminals; 201 series 2400 bit/sec modems; 100,200 and 400 series low/medium speed modems; and data couplers.

The firm will be at booths 2827 and 2829.



General Datacomm's 1202 Series Time Division Multiplexer

## Modems Main Attraction At ICC/Milgo Exhibit

NEW YORK — ICC/Milgo will display a line of data communication products, including modems for data transmission over dial-up phone lines or leased data lines.

Modems operate at data rates from 2,000 bit/sec to 9,600 bit/sec. LSI modems for 2,000 bit/sec and 2,400 bit/sec data communication will also be shown.

ICC will also display data communication test equipment and accessories at booth 2115.

## Comdata Unit Expanded

NEW YORK — Comdata Corp. is showing an expanded version of its Series 330 rack-mounted modems.

The 330 cabinet provides space for up to 16 modems and 16 associated Model CBS or CBT Data Access Arrangements, plus a display panel indicating the status of four control and two data functions.

Other data communications equipment on display at booth 2016 will include modems, acoustic couplers, multiplexers and terminals.

# ON-LINE TERMINAL OFF-LINE TERMINAL AND INTELLIGENT "3270"

### INTRODUCING THE SYCOR 250.

It's our new intelligent on-line terminal that's lower priced than IBM's 3270\* and compatible in both hardware and software.

In fact, you can just plug it into any IBM network and let it go to work.

But, unlike the 3270, our Sycor® 250 has many of the intelligent features that have made our Model 340 remote batch terminal so popular.

Features that let the 250 check branch office key entry field-by-field instantly, providing clean



— and you spend less time on the line. So, you can install more terminals per line, and probably end up needing fewer lines and ports.

### NEW DUAL TRACTOR PRINTER

The 250 has some pretty impressive optional equipment, too. It's available with a badge reader, a light pen and a family of versatile printers.

The printers are our new 2580 series, with 40, 80 or 165 cps speeds. They feature dual tractors that handle two independent continuous forms simultaneously. So now you can combine your forms printing and administrative message traffic on one printer.

### HOOK A SYCOR 250 INTO YOUR 3270 NETWORK

See what our 250's intelligence can do for you. We think it's the best in the industry.

And we're the people who invented intelligent terminals in the first place.

# SYCOR

See the Sycor 250 at the National Computer Conference. We'll be in booth 2601.



\*A trademark of IBM

Our big computers  
have a lot more  
of the things  
that make us big  
in little computers.

If you know our minicomputers you know what makes us the world's leading maker of minicomputers.

Things like advanced architecture. All those peripherals. All that software. All the different levels of computer power we offer. Their flexibility. Compatibility. Easy interconnections. Interaction. On-line, real-time program preparation and debugging. Applications expertise drawn from 20,000 installations.

But you may not know as much as you should about our big computer that has them all and much more. DECsystem-10. It has such things as Dynamic Resource Allocation. A software technique that makes the computer actually sense the demands being put on it, and handle those demands in the most efficient way. Believe it or not, most computers

spend less than 50% of their time on useful work. DECsystem-10 usually works on work more than 80% of the time.

And if you think about that for a minute, you'll realize it means you can get more work out of your computer. That's the real reason why we use it. So you can get a DECsystem-10 to do your job for usually half what it will cost from other companies.

DECsystem-10 has the other things you've come to expect from us, too.

It has all the options available with our minis, plus many of its own. All the interfaces you need to hook them up. All the software you'll need. COBOL, FORTRAN, BASIC, ALGOL, APL, TENFOR, SNOBOL, LISP, AID, BLISS. There's even simulators that'll let you use the DECsystem-10 to write, edit, assemble and debug programs for all our other computers.

And yes, it works just beautifully with our minis. Anyway you want. You can come to us and talk about networks, hierarchical systems, distributive data systems or raw computer power. We'll recommend what you need to do the job right. And for the same reason why we can do that with our minis. We have everything you need to do the job. Whatever the job.

You see, what makes our minis so great is what makes our big computers even better.

Write the DECsystem-10 Group, Digital Equipment Corporation, Maynard, Mass. 01754. (617) 897-5111. European headquarters: 81 route de l'Aire, 1211 Geneva 26. Tel: 42 79 50. Digital Equipment of Canada Ltd., P.O. Box 11500, Ottawa, Ontario, K2H 8K8. (613) 592-5111.

**digital**



DECsystem-10: It'll give you everything you expect of Digital. Only more of it.

## Oktronics Shows Readers, Encoders

NEW YORK — Oktronics Data will be showing its line of circular magnetic readers and encoders plus a paper tape reader.

The electromechanical MRA-001 reader is designed to read magnetically coded unit records at the point of action.

The MWA-001/002 reader/writer can be used as a circular magnetic encoding station for inclusion on media-handling devices, or as a terminal assembly to read

### Science Accessories Brings Graf/Pen

NEW YORK — In its exhibit, Science Accessories Corp. will demonstrate its Graf/Pen sonic digitizer plus a cursor offered as an alternative to the standard pen-type stylus.

The Graf/Pen is used to convert graphic information into digital form for data

### NCC Input/Output

storage, processing or transmission. It can also be used to enter alphanumeric information or programming instructions by assigning specific meanings to dedicated locations on its tablet.

The cursor employs a piezoelectric crystal to generate sound waves, rather than a spark gap as is used in the standard pen, the firm said. This makes the Graf/Pen suitable for use in hazardous atmospheres and also reduces audible sounds, the firm added.

The firm will be at booths 1632 and 1634.

### Terminal Equipment Features Printer

NEW YORK — An interface printer for use with Digital Equipment Corp.'s PDP-8 computer and an acoustic coupler compatible with the Bell 103A modem will be exhibited by Terminal Equipment Corp. at booth 1114.

The computer interface — Holmes Tycom Model CSR-8E — is a plug-to-plug hard-copy printer. It provides full upper and lower case characters and interchangeable type font.

The Tycom Model 920 originate-only acoustic coupler will also be on display. The unit is compatible with the Bell 103A modem and operates at rates up to 300 bit/sec. It can automatically switch between data and acoustic operations and full- and half-duplex mode, and can be used with any terminal having an EIA RS232 connector.

### Gould Data Systems Sets Up Printer/Plotter Display

NEW YORK — An electrostatic printer/plotter for the minicomputer market will be shown at the Gould Data Systems exhibit.

The Gould 5000 prints alphanumeric data at 1,200 line/min and plots graphic material at three in./sec. It generates 132 char./line and has a resolution of 100 dot/in. vertically and horizontally.

The company will also exhibit the Gould 4800 electrostatic printer/plotter, which operates at speeds up to 4,000 line/min.

Both units can be seen at the Gould booths 2006 and 2008.

### Versatec Unveils Plotters

NEW YORK — Versatec will demonstrate two new products — a 20-in. raster scan plotter and a 20-in. combination printer/plotter.

The Matrix Model 2000 Plotter and Matrix Model 2000A Printer/Plotter both use 20-in. wide paper in 500-ft rolls and are designed for operation with computer systems of all types, the firm said.

The Model 2000 costs \$8,900 and the Model 2000A is priced at \$10,900.

Versatec will be at booths 1815 and 1817.

unit records, alter the encoded data and reverify it.

The MME-001 magnetic media encoder can be used with a teletypewriter or computer through a current or RS232C interface. The unit can encode in 8-bit ASCII with 32 char./magnetic patch.

Oktronics' TR930F paper tape reader, with 225-ft fan fold capacity, features stop on character, no buffer, companion handlers for all readers utilizing d-c servo motors and high-speed bidirectional rewind.

Oktronics Data will be at booth 1820.



Oktronics' TR930F Paper Tape Reader



While one operator keys data into Decision Data's 9610 Interpreting Data Recorder that punches and verifies 96-column cards, another sorts previously punched cards on the 9620 Alphanumeric Sorter.

## Decision Data Recorder Ready

NEW YORK — Decision Data Computer Corp. will display units from its line of 96-column peripherals and data preparation equipment.

The exhibit will feature the 9660 Sorting Data Recorder for the System/3, which, in addition to functioning off-line as a 96-column keypunch/verifier/sorter,

can also be used on-line via an interface as an input reader and output printing punch, the firm said.

The unit sorts at 300 card/min and gang punches at 60- to 120 card/min.

Decision Data will be at booths 2719, 2721 and 2723.

# A money-saving idea that IBM doesn't like to talk about.

It was probably someone at IBM who invented the term "mass memory" a decade or so ago to describe their tape drives, disc drives and drums. Maybe they were "mass" storage back then. But in light of today's data storage requirements, they really have to be considered "mini memories."

And as you've probably noticed as your storage requirement has grown, so have the costs of your growing stable of discs and tapes.

While IBM keeps on grinding out the

tapes and discs, we started thinking of ways to cut costs, cut down handling and put more data on-line in a real mass memory system.

### Enter MASSTAPE™

We introduced the result of this thinking. We called it MASSTAPE, the first commercial on-line mass memory system.

By using a high density data storage system we developed during the Apollo program, we were able to find a way to put your active tape library on-line.

Be sure to see us at the NCC '73 at Booth 2427.



The basic system can replace up to 32 tape drives and four controllers at less cost and provide greater throughput.

## Interdata Model 85 Shines

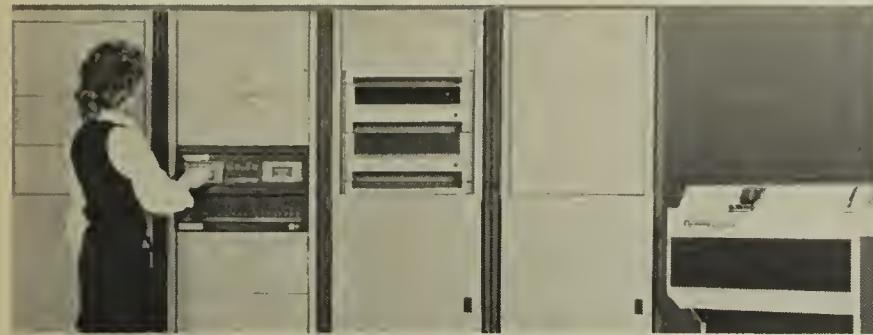
NEW YORK — Highlighting the Interdata exhibit will be the New Series Model 85 processor, featuring a user-alterable dynamic control store which contains 1K words of 60 nsec bipolar read/write memory.

With 16K bytes of LS1-MOS memory, built-in teletype interface and dynamic control store, the processor carries a single unit price of \$22,800 and will be available for delivery in June.

Also on display at the Interdata booth will be the Model 70 and 74 processors featuring 16K bytes of core memory on a single 15-in. printed circuit board.

Additionally, Interdata will show new data communications systems and modules, plus a line of peripherals that interface with the company's New Series family of compatible processors.

Interdata will be at booth 2345.



Interdata Model 85 Processor



Grumman Data Systems' Masstape

## Grumman Focuses on Masstape

NEW YORK — Grumman Data Systems will feature Masstape, a memory on-line storage system.

Masstape is designed for 360 and 370 systems running under OS. Designed on the modular principle, Masstape units can be added as the demand increases, with a storage capability of up to one trillion bits. Data rates go up to 1.2M byte/sec, and the system has up to 32-device addressability per computer interface.

Purchase price for a basic system, including an interface unit, data buffer unit, system control unit and one storage unit with a capacity of 14 billion bytes, is under \$356,000. The same system can be rented for approximately \$11,800/mo, including maintenance.

Grumman will be at booth 2427.

## Datacraft's Slash 5 Operates With Disk

NEW YORK — The Datacraft exhibit will be highlighted by a Slash 5 computer system operating under the Disk Monitor System (DMS). Included in the Slash 5 system are four terminals, disk, line

### NCC Minis and Memories

printer, card reader and real-time interface equipment.

The Slash 5 computer is one of a line of five program-compatible computers which feature a 24-bit word and memory speeds varying from 600 nsec to 1 nsec. In addition to DMS, three other operating systems are available. All systems provide for operation of six languages and seven support software packages, the firm said.

Datacraft will be at booth 2433.

## Disk 'Sings' Out At Librascope Booth

NEW YORK — Singer Librascope will feature its line of L107 disk memories at NCC booths 1724 and 1726. Librascope will also display operating models of its track ball and joystick interactive controls.

The latest addition to Librascope's mini-memory line, model L107B, provides up to 18M bits of storage on 256 tracks within a 14.7 in. by 9 in. package.

The company's model L107A and militarized L107MA offer up to 7M bits storage capacity.

## Modcomp IV Introduced, Features 32-Bit Bus

NEW YORK — Modular Computer Systems, Inc. will introduce the Modcomp IV, a 16-bit word machine which features a 32-bit bus. Prices start at between \$15,000 and \$20,000 for a 16K version with expansion up to 256K words.

MAX III, a real-time multiprogramming executive, will also be featured performing remote job entry to an IBM/360.

Modular Computer Systems will be showing its products at booths 2240 and 2242.

## Datum Shows Its Wares — Controllers, Cassettes

NEW YORK — Datum Inc.'s display at booths 2740 and 2742 will include mini-computer peripheral equipment, magnetic tape controllers, disk controllers, magnetic tape input systems, digital cassette recorders, universal data systems, mass memory systems and timing instrumentation.



This twin-computer center with a 28-billion-byte MASSTAPE system can result in a saving of over \$400,000 per year over current methods.

your own computer center.)

The system is compatible with 360/370 systems under OS without costly reprogramming. And we'll be glad to discuss adapting it for users of other large systems.

MASSTAPE is installed at Grumman Data Systems' own computer center. And it's in production for several top Fortune 500 companies.

If you're interested in saving money, please contact our sales office nearest you or Grumman Data Systems Corporation, 711 Stewart Avenue, Garden City, L.I., N.Y. 11530. (516) 575-3034.

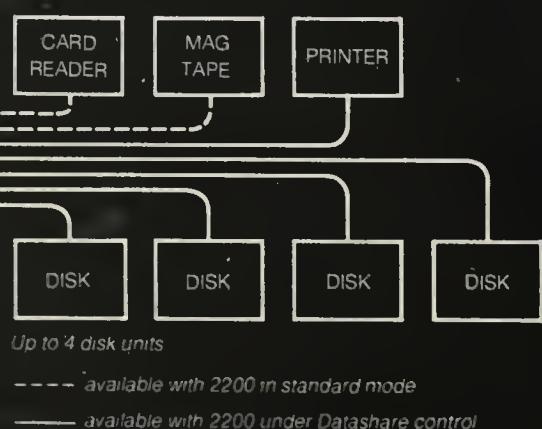
## MASSTAPE by Grumman Data Systems

Eastern Region  
(212) 532-1122

Washington, D.C. Region  
(202) 872-1800

Central Region  
(312) 654-2755

Western Region  
(213) 322-6990



# Datashare

A New Equation  
in Computer Systems

1=8

**Datashare** from Datapoint Corporation constitutes an important innovation in the use of computer systems for business administrative and management applications. Through Datashare, the full capability of a *single* Datapoint 2200 computer system is made available simultaneously at as many as *eight* remote user stations on terminal units as various and as inexpensive as Datapoint 3300's, Datapoint 3360's and standard teletypewriter machines.

With well over two thousand Datapoint 2200 systems currently in use, this versatile low cost system has established an enviable reputation as an all purpose business computer. Now through the Datashare programming package, as many as eight remotely located users can utilize a Datapoint 2200 system as though it were their own on-site computer for on-line data input tasks and other general business applications. But with these key differences: this access is achieved (1) at *just a fraction* of the already low cost (prices begin at \$6,040) of the 2200, and (2) *without* the waiting and *inconvenience* often associated with the usage of an on-site computer.

Through Datashare, business and commercial computer users can enjoy the full benefits of the many recent advances in computer and data communications technology incorporated into Datapoint equipment. Through the combination of

the Datashare system and the Databus programming language, users can readily create application packages for most general management and administrative needs such as real-time inventory control, parts replenishment, production scheduling, labor distribution and other dynamic applications involving volume data input from multi-locations and associated production of reports.

Each remote user on a Datashare system accesses the central Datapoint 2200 independently from his own terminal unit, for his own application needs. For users in close physical proximity to the 2200 as in the same facility or building complex, communications with the central computer is obtained through direct wiring. For cross-city or cross-country users, linkage can be provided through standard telephone service.

The central Datapoint 2200 system used with Datashare can incorporate from one to four disc file units each capable of storing 2.4 million characters of informa-

tion in replaceable cartridges for user data files and programs, and a high speed printer. For "Off-line" use as a standard 2200 system, the configuration can also include a card reader, 7- and 9-channel magnetic tape units and other Datapoint peripherals as well as the disk units and printer.

Datashare delivers a new kind of dispersed data processing capability for organizations whose operations are decentralized but who want to enjoy the economies and the management advantages of centralized data processing. For present and prospective business computer and computer service users, Datashare presents an optimum approach to securing new efficiencies and new economies in data conversion and entry, data transmission and data processing. For further information on Datashare and how it can help your business, contact the Datapoint sales office nearest you, or write or call:

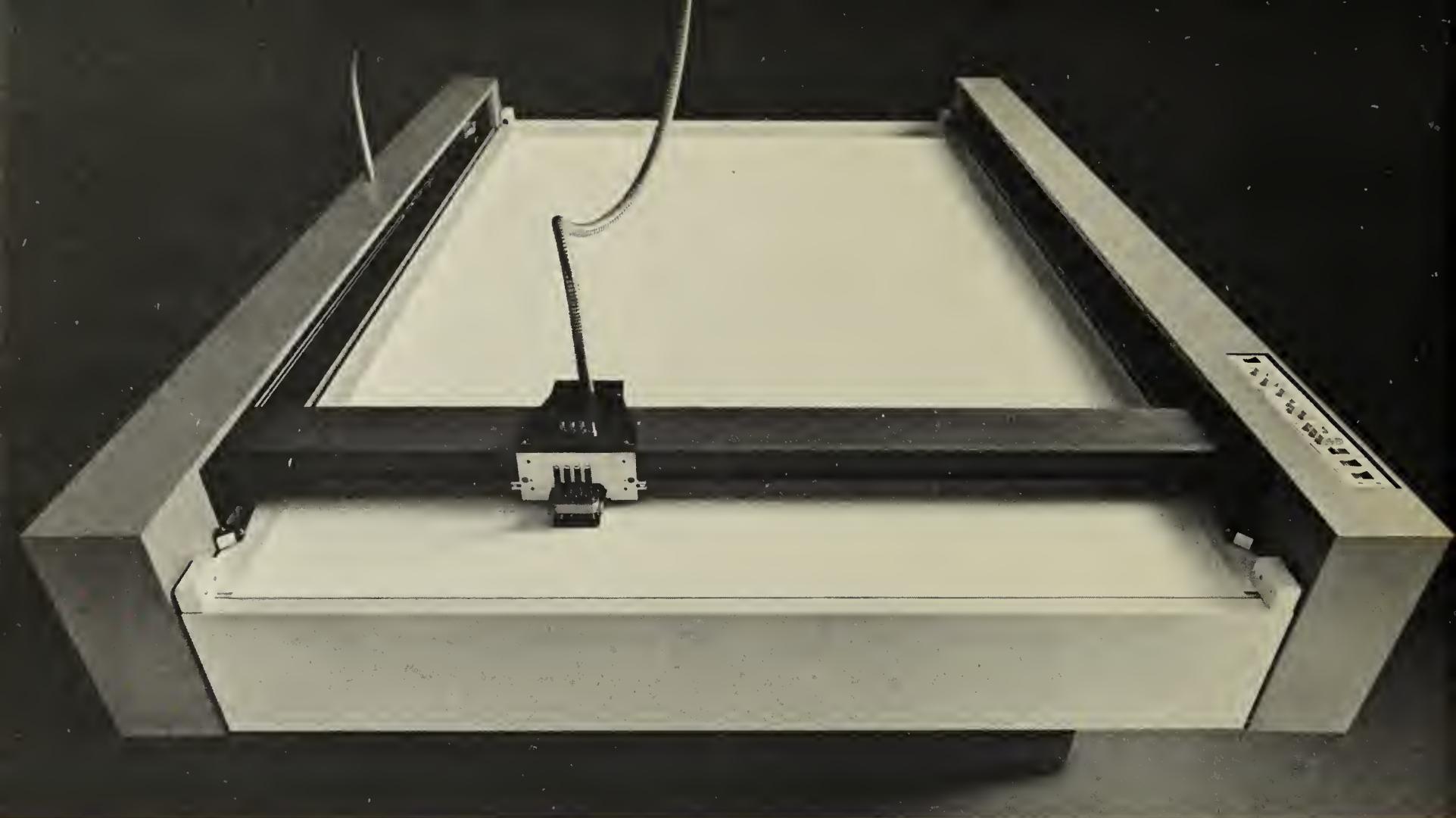
*Datapoint Corporation  
9725 Datapoint Drive,  
San Antonio, Texas 78284  
(512) 696-4520*



# Datapoint

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## The four-fingered fast-drawing kid is coming to town.

We call it the 748. It's big. And it's fast.

Its 4 inking pens move at speeds over 40 inches a second. That's faster than ink flows, so we had to figure out a pressure inking system that lets the ink catch up to the pens.

If you make integrated circuits or maps. Or if you have precision drafting needs, this is the new tool.

The 748's plotting area is 48" x 82". It can scribe

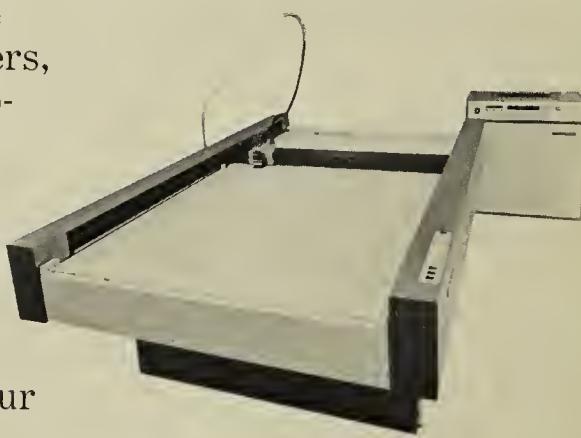
coated materials and cut strippable film. At peak speeds!

The quality of its line is not impaired by its incredible speed. And like all CalComp flatbed plotters, the new 748 offers easy-to-use software for most computers.

We service it in 29 countries. But the way we've made it, you won't be calling us very often.

Do call us to see it. Our

number is (714) 821-2011. Or write California Computer Products, Inc., CW-M5-73, 2411 West La Palma Avenue, Anaheim, California 92801.



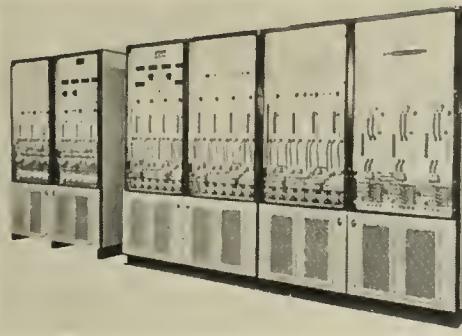
**CALCOMP**

## Exide Features UPS Systems Inverter

NEW YORK A stepped wave inverter for battery-backed uninterruptible power supply (UPS) systems will be shown by Exide Power Systems Division of ESB Inc.

The "Superguardian" uses a digitally controlled stepped wave inverter with subcycle current control. It is available in ratings of either 200 kVA or 125 kVA at 0.5 to 1.0 power factor. Its overload capacity is stated at 125% of rated kVA for 10 minutes, to as high as 250% line to neutral current for 10 cycles. Transient recovery is accomplished within 50 msec for complete recovery to within plus/minus one percent band, the firm said.

Exide Power Systems will be at booth 1423.



SuperGuardian

## Data Test Unveils Circuit Analyzers

NEW YORK A family of circuit analyzers for testing circuit board assemblies and a ground tester will be introduced by Data Test Corp.

The Datacenter 5700 series will handle large analog/digital circuit board assemblies and will also have a number of computer-enhanced testing capabilities, the firm said. The stand-alone systems will

combine a mag-tape cassette, test head and test control unit.

Data Test's AC ground tester for detecting wiring problems will cost about \$300 in quantity.

Data Test will be showing its products at booths 2633 and 2635.

## Nortronics Brings Magnetic Head Line

NEW YORK Nortronics Co., Inc., will display its line of magnetic heads, including read-after-write heads, cassette read-

NCC

OEM Products

after-write heads and floppy disk system heads.

The 1/4" line of digital heads is available with one track for serial mode recording, or with two or four independent tracks. Selective track piggy-back erase heads are also available for each track configuration.

The cassette read-after-write heads were designed for applications in .150 in. tape systems, the firm said.

The firm stated the mini-digital heads utilize technology that reduces crossfeed between the write and the read gaps to under 5% at a tape speed of 10 in./sec.

The cassette heads operate at a minimum resolution of 85%, at a ratio of recording densities of 1,600/1,800 flux reversal/in., and are available in multi-channel configurations.

The firm's display will also include its floppy disk series FD, including read-after-write, wide write/narrow read, read-only heads and read/write straddle erase heads.

These heads are designed for operation in IBM-compatible, read-only mode, and in 32- and 64 track/in. at a density of 1,600 bit/in.

Nortronics will be at booth 1311.

## Memories, Microcomputers

### Intel Exhibit Leaders

NEW YORK Intel will display a line of memory and microcomputer systems, featuring add-on memory systems for the Nova 1200 and IBM 370/155, 165 and 145 computers. Also on display will be a line of semiconductor memory systems that are available in both basic card form or complete systems with power supplies.

The firm will feature the in-26 RAM with a basic capacity 4K by 8 expandable to 16K by 8.

The in-50 Memory System with a cycle time of 100 nsec will be exhibited. The in-50 is a 1K by 10 bit system on one 6 in. by 8 in. PC card and is designed for use in high speed applications, Intel said.

Also being displayed will be a line of microprocessors called the MM4 and 8. These minicomputers will be available by mid-summer and will come as a basic card set or packaged for mounting in a 19 in. relay rack with an operator's display panel. The basic card set will include a CPU board, memory board, ROM board and I/O board for use with a teletype-writer machine.

Intel will be at booths 2802 and 2804.

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# UCC leadership software

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the industry's  
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A year ago PGI introduced the 844 Universal Controller and made it possible to mate different main frames and peripherals merely by changing circuit cards. Today that basic controller is part of disc and tape systems for the CPUs of three computer manufacturers. How about expanding the effectiveness of your CPU or peripherals? You may find we have all or most of the solution already on cards. These other people did.



**360/370 users**

The PGI 844 disc systems are 360/370 compatible and range from 29 Mbytes (entire system in one cabinet) to 466 Mbytes (9 drives and controller in 5 cabinets)—with advantages over the 2319 in space, capacity, speed, maintenance and price. They feature linear motor actuators and more comprehensive diagnostics. They employ 2316 type disc packs with 203 and 406 tracks. Average access time is 29 ms, and average latency is 12.5 ms.



**Leasing Companies**

The PGI 844-L universal controller provides a practical solution to one of the most perplexing problems facing leasing companies and computer brokers—what to do with the remaining drives after you have split a 2314 disc system. For a modest cost, the 844-L will allow a complete disc storage system to be made with the remaining drives that is compatible—both hardware and software—with 360 and 370 systems.



**GE / Honeywell users**

The PGI Model 844-1 directly replaces the Honeywell 160, 167 and 180 disc systems in the 400, 600 and 6000 computers. It features double spindle design; double density, 20 surface disc packs, and linear motor positioning.

This means 20% to 100% more storage; 25% to 50% less floor space; 15% to 100% faster access; greater reliability; simpler maintenance and \$750 to \$2,000 a month lower rental.



**3803 tape users**

The PGI Model 844-T controller is a lower cost direct replacement for the IBM controller in the 3803 tape systems. The 844-T also makes the system plug-to-plug compatible with GE/Honeywell CPUs. This means that these computers now have a 7/9 track, all density, all speed, nine drive tape capability with automatic off-line features.



CHERRY HILL INDUSTRIAL PARK, CHERRY HILL, NEW JERSEY 08003 (609) 424-2008

## Interdyne Tape Drives in Town

NEW YORK — Interdyne Co. will exhibit its 2500 family of digital cassette tape drives at the NCC. The IC 2500 features a single, servo-controlled capstan motor and a pair of individual reel motors to control tape velocity and tension.

### Di-An Demonstrates 9030 Teleprinter

NEW YORK — Di-An Controls, Inc. will introduce its Model 9030 teleprinter, which uses a matrix impact printhead with operator-selectable speeds of 10-, 15- and 20 char./sec. It offers 132-

#### NCC OEM Products

column print capacity; full ASCII upper- and lower-case codes; form-feed tractors that adjust from two to 16 inches; half- and full-duplex or local operation; add, even or no parity error detection; the ability to handle six-part copy; and an RS232C interface.

The terminal includes an integral power supply, electronics, keyboard and printer assemblies and costs \$1,955 in OEM quantities.

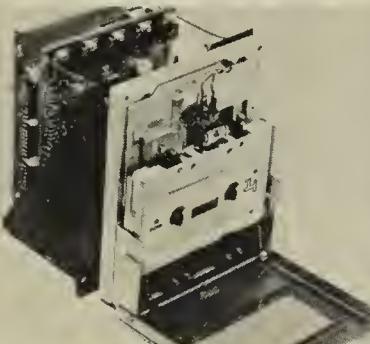
Di-An will also demonstrate its line of computer-driven ticket, tag and label printers. Various models can print both large and small alphanumeric characters, OCR fonts and bar codes at 1,200 line/min.

The company will be at booth 1332.

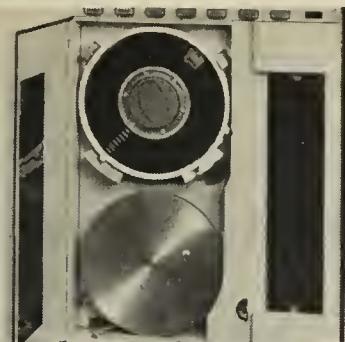
Data can be recorded synchronously, by record, at rates up to 16 kbit/sec, or incrementally, by character, up to 30 char./sec. Corresponding read/write speeds are 2 in./sec to 20 in./sec, bidirectionally, with capstan control search speed of 40 in./sec.

Configurations are available with 1-, 2- or 4-track, single or dual gap heads, with independent read/write amplifiers.

Interdyne will be at booth 2725.



Interdyne Tape Drive



Wangco Mod 1200 Tape Drive

### Wangco Shows Drive

NEW YORK — A vacuum column tape drive, with automatic tape loading, will be introduced by Wangco, Inc. at booths 2718, 2720 and 2722.

The Mod 1200 offers tape speeds from 25- to 75 in./sec with vacuum columns, single capstan drive and IBM head guide spacing.

Transfer rates are up to 120 kbyte/sec, with data densities to 800 char./in. NRZI, 1,600 phase encoded, or 800/1,600 dual-density combination.

## IDS Disk Memories For Minicomputers Set for IDS Exhibit

NEW YORK — Information Data Systems, Inc., will show its family of fixed-head disk memories for OEM minicomputer applications.

The memories provide up to 12.8M bit storage capacity at a reduction in cost/bit over earlier models, the firm said.

The 6000 Series Disk Memory includes double-density phase-modulated recording and non-contact flying heads. Units are available in eight- to 128-track configurations, with memory capacity of 100K/track.

Alternately, 4K 16-bit word/track can be accommodated, providing up to 512K word capacity.

Packing density is nominally 2,700 bit/in. Access time is 8.3 msec at 3,600 rpm, and bit-serial transfer rate is 6 MHz. Interface is at TTL level.

The units are priced at about \$7,000 for quantities of 100. The firm will be at booth 1116.

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# UCC leadership software

Pertec P7330 Line Printer

**Circuit Packaging Presented**

NEW YORK — Scanbe Manufacturing Corp. will display its line of integrated circuit packaging, which includes socket cards, socket card files, socket panels and socket panel drawers at the NCC.

Scanbe will be at booths 1107 and 1109.



**Circuit Packaging Presented**

NEW YORK — Scanbe Manufacturing Corp. will display its line of integrated circuit packaging, which includes socket cards, socket card files, socket panels and socket panel drawers at the NCC.

Scanbe will be at booths 1107 and 1109.

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minicomputer company we know of that unconditionally warrants all our software for a full year.

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cassettes, or line printers up to 600 lpm. Just what your customer needs. And when his needs change, so can the system. Easily. Anytime.

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See it at the NCC, Booth 2831.

## 5 British Firms To Demonstrate Their Products

NEW YORK — Five British companies will be showing hardware and software products.

The Shadow system to be shown by Altergo Ltd. provides teleprocessing and

### NCC Other Products

multitask monitoring and is capable of supporting both local and remote devices under the IBM 360/370 disk operating system, the firm said.

The Modular One, a range of independent modules, processors, stores and peripherals which can be combined to provide a custom system will be shown by Computer Technology Ltd.

The system features multiprogramming and, under the overall control of the executive software, each user program is given access to its own segments in store.

Computer Co-operatives Ltd. will show its Simulation Program — Speed (Simulation Program for Efficient Evaluation of Dynamics).

A range of magnetic disk memories reportedly designed to operate in harsh environments will be introduced by Process Peripherals Ltd.

The company's Series 100 disk designed as a backup store, will be on view.

Mastertape (Magnetic) Ltd. will show its disk packs and disk cartridges which are compatible with IBM interface requirements.

The British exhibit will be at booths 1122, 1125, 1126, 1128, 1131 and 1132.

## CMC to Display "Keyprocessing"

NEW YORK — Computer Machinery Corp. will demonstrate two of its Keyprocessing systems.

The expanded CMC 5 system handles up to 16 keystation keyboard units and stores up to 480 formats and 18K records. It lease for \$570/mo plus \$70 for each keystation.

CMC will also display its Dataprint off-line printing system at booth 2227.

## Two DP Directories List Sites, Suppliers

NEW YORK — The *Official Directory of Data Processing* will show the summer 1973 edition of the *Eastern & Western Computer Users Directories* at the NCC. The listings contain information pertinent to over 27,000 DP sites.

The *EDP Vendors Guide* will also make its debut. This directory contains a complete listing of suppliers to the computer field, and is arranged in 26 categories of suppliers, such as hardware, software, consulting, etc., for each geographic region of the country.

They will be at booth 2811.

## Computer-Link Reveals New Tape Cleaner Kits

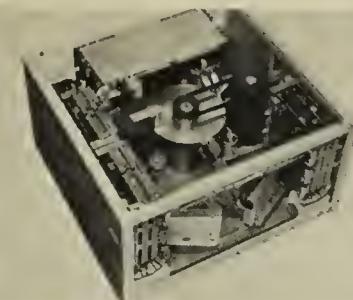
NEW YORK — Computer-Link Corp. will introduce three new products at NCC's booth 1716, including increased capabilities for its Series 1000 Magnetic Tape Evaluator/Cleaner.

Also shown for the first time will be the Model 111 Cassette Tape Cleaner/Rewinder.

In addition, the firm will introduce a new line of cleaning kits for tape drives and CRT terminals, and free samples will be available at the booth.

## Firefighters Here!

NEW YORK — The Ansul Co. will be exhibiting its line of Halon 1301 fire control systems at booths 1414 and 1416.



Process Peripherals Ltd. Disk Memory

## Tally Exhibits Line Printer

NEW YORK — The Tally Corp. exhibit will feature the Series 2000 line printer and the Tally Datascribe remote batch terminal, plus a line of paper tape peripherals.

The printer will be shown in both 125 line/min and 200 line/min versions and is available in a range of interface configurations.

Price is in the \$5,500 to \$6,500 range

depending on the model and interface configuration.

Both printer models are offered as options to the Tally Datascribe terminal product line which will also be on display at booths 1203, 1205, 1207 and 1209.



Tally Line Printer

## Auerbach DP Manual Introduced

NEW YORK — Auerbach Publishers will introduce its *Data Processing Manual* at the NCC. The manual is designed to help data processing managers attack their daily problems and is available at a special convention combination discount price, according to the firm.

Initial subscribers will receive more than 20 sections and each month new reports will be added. The service is tab-indexed for easy reference into six primary sub-

ject areas: general management; DP administration; systems development; standards, practices and documentation; operations; and technology.

Individual portfolios within these areas span the entire scope of problems the manager faces every day — from selecting and motivating people to preparing budgets to properly making system design tradeoffs, according to the firm.

Auerbach will be at booth 2017.

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Odec Line Printer

## Odec Offers Printers

NEW YORK — Odec Computer Systems, Inc. exhibit will feature the firm's impact line printers.

The machines have print speeds from 100- to 250 line/min, with 48-, 64- and 96-char. sets, 80 and 132 print columns and two and 12 channel formatting.

Odec will also display its "Quiet Cabinet" line printer models at booths 2867 and 2869.

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## Identimat Security Systems Set

NEW YORK — Identimation Corp.'s display will feature two on-line security systems.

The Identimat 2000H protects data, files or programs stored in the computer and only releases this information when the authorized person is physically present at a terminal, the firm said.

The unit identifies persons by their hand geometry characteristics, the firm added and so requires no magnetic striped identity card.

The firm will also show its Identimat 2000D time clock for automated payroll applications, its 2000S and C units for high security access control and a line of lower security Identimat card readers. The firm will be at booth 1412.

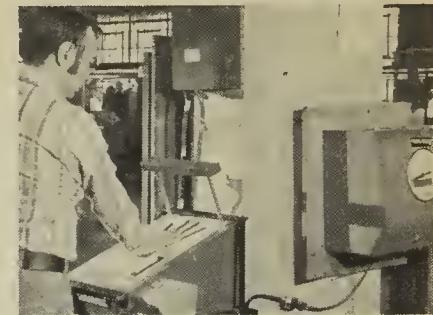
## Scriptographics Has Tablets, Digitizer

NEW YORK — Scriptographics Corp. will be showing its line of data tablets and digitizers, which include such features as absolute coordinates and the use of stylus or cursor.

The units use either binary or BCD and have a resolution of 100 line/in. There are four selectable operating modes for updating coordinates—point, stream, switch stream and remote.

The units have an active area of 11 in. by 11 in. and are priced at \$2,000.

The firm will be exhibiting at booth 1120.



Employee signs in using Identimation's Identimat security system.

## Timesharing System Makes Time

NEW YORK — Basic Timesharing, Inc. will show its Model 3000 Interactive Timesharing System at booths 2726 and 2728.

The system's central processor is a 16-bit computer with hardware floating

### NCC Other Products

point arithmetic and 48K bytes of 980 nsec core memory.

Bulk storage is available in increments of 2.4M and 49M bytes respectively in the models 3150 and 3250 disk drives. Up to 80 3250 disk drives may be employed on a single system.

### Dupont Devotes Exhibit To Fire Extinguishing System

NEW YORK — Du Pont's exhibit will be devoted entirely to Halon 1301 fire extinguishing agent.

Demonstrations of the flame extinguisher, together with discussions of the properties of Halon 1301, will be conducted several times a day in a see-through plastic booth within the exhibit area at booths 2110 and 2112.

The system supports up to 16 interactive terminals operating at individually selected data rates from 100 to 2,500 bit/sec over standard telephone lines or by direct connection to the system.

## Data Concentrator, Modems Coming To Timeplex Booths

NEW YORK — At NCC, Timeplex Inc. will feature its C-32 data channel concentrator which allows up to 32 calling terminals to contend for up to 16 computer ports. Shown for the first time will be Timeplex's line of 103/113/202 equivalent modems in card only, desk top or multiplexer channel versions. These modems feature digital receiver and transmitter circuits.

The firm will also display its line of voiceband and wideband time division multiplexers for asynchronous, synchronous and isochronous data, its automatic linebacker which restores communications after line failure and its dual interface automatic calling unit which can be used as an 801 replacement.

Timeplex will be at booths 2817 and 2815.

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Tape Drives  
IBM 1130... \$11,000.**

Includes all hardware and software—  
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# Net of Exchanges a Boon to UK Brokers

By E.M. Hargreaves

Special to Computerworld

LONDON — A computer system now operating in Manchester offers all stockbrokers in the UK and Wales — except in London — a full service of bargain reporting, accounting and control stock payment.

The \$1 million installation is the result of a data processing system first adopted by the Manchester Stock Exchange in 1967 when punched cards were used for bargain reporting and matching, settlement lists and differences settlements.

In 1969 the system, which was used by all provincial exchanges, was transferred to an ICL 1905F computer system run jointly by International Computers Ltd., and Barclays Bank Ltd.

Early in 1972 the United Stock Exchange decided to run its own system and a new company, N.M.W. Computers Ltd., was formed.

The new company took over all the systems, about 80 in all, including installed hard-copy data stations in Stock Exchange Centers and individual brokers' offices.

The new system selected was an ICL 1904A with 32K words of memory. Also included were eight EDS8 exchangeable disks with a total capacity of over 64M characters; eight 7020 communications terminals; four 9-track magnetic tape decks at 1,600 bit/in., 80 kchar/sec; two paper tape readers at 1 kchar/sec, five paper punches at 300 char/sec; two line printers at 1,350 in./min and one card reader. An EDS 60 system (with four transports on two controls and a total capacity of 240M characters) will be installed later this year.

There is also available to brokers, and to jobbers — firms which do not have an equivalent in the U.S., and which operate as virtual stock wholesalers, specializing in certain stocks and buying and selling for their own accounts — a daily bargain reporting service, full accounting systems and central stock payment.

## Network of Exchanges

The bargain reporting process is effected through ICL 7020 communications terminals located at nine stock exchange centers and brokers' offices throughout the region, which are linked with similar terminals at the computer center's Link Room.

Details of bargains are stored on the computer files and each evening details are compared and matched to ensure that parties to each deal are agreed.

Lists of matched bargains and unmatched reports are prepared and collected overnight by a security organization for delivery so each member firm has full details of the previous day's trading by 9 a.m.

The British Stock Exchange system is unlike the American in that it does not have "over-the-counter" deals, and stock certificates are non-negotiable. The system operates on a two-weekly account period plan, and at the end of each stock exchange accounting period the computer provides various other printouts for members — including "full settlement" lists showing all agreed deals struck with "calculated midpoint settlement prices."

Some 60% of dealers in the region use the full accounting services offered, and this accounts for about 80% of N.M.W.

## ...Long Live Ribbons

NEW YORK — Three models of the Teda XRL/100 extended ribbon life system will be shown at NCC by Jersey Tab Card Corp.

The accessory re-inks printer ribbons on-site in a computer installation.

In addition to the XRL system, the exhibit will display other supplies and accessories, including XRL long life ribbons and a line counter for the IBM 1403 printer.

JTC will be located at booth 1712.

Computers' total business.

Each dealer has at least one Olivetti TC308 hard-copy data station which is used to enter details of bargains onto 8-track punched paper tape. In all, there are 48 remote 7020 terminals and 130 Olivetti TC308 terminals. On establishment of a link between the broker's ICL 7020 terminal and the center, data on the paper tape is transferred at 1,200 baud between the two terminals. The center's 7020 then produces identical punched paper tape.

This is read to disk and after reference to appropriate files the computer produces a contract note for valid deals notified. This is relayed back to the broker, again by punched paper tape.

At the end of each 14-day account period all clients' ledgers and other files are updated, matched deals are pieced together and brokers receive settlement lists giving full details of all stocks dealt in. Payment lists also show the net amount each member must pay or receive from the Inspector of Clearing Account.



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The high speed of the unit reduces telephone charges, or use of WATS lines.

The ASR tape capability lets you set up format control on paper tape for multiple transaction type applications. The cassettes perform data storage and transmission functions.

Some other goodies: three line speeds — 10, 30 and 120 cps; data search and back spacing capability; \$108 per month for the KSR model, \$121 for the ASR.

Our new 33 plus cassette buffer brings our

product line up to 74 terminal models with 202 options. This means you can solve your various terminal problems in a variety of ways.

If you use more than one terminal, you can mix different terminals — each matched to the specific requirements of each location in your system. Our systems planning experts will help you make the optimum choice.

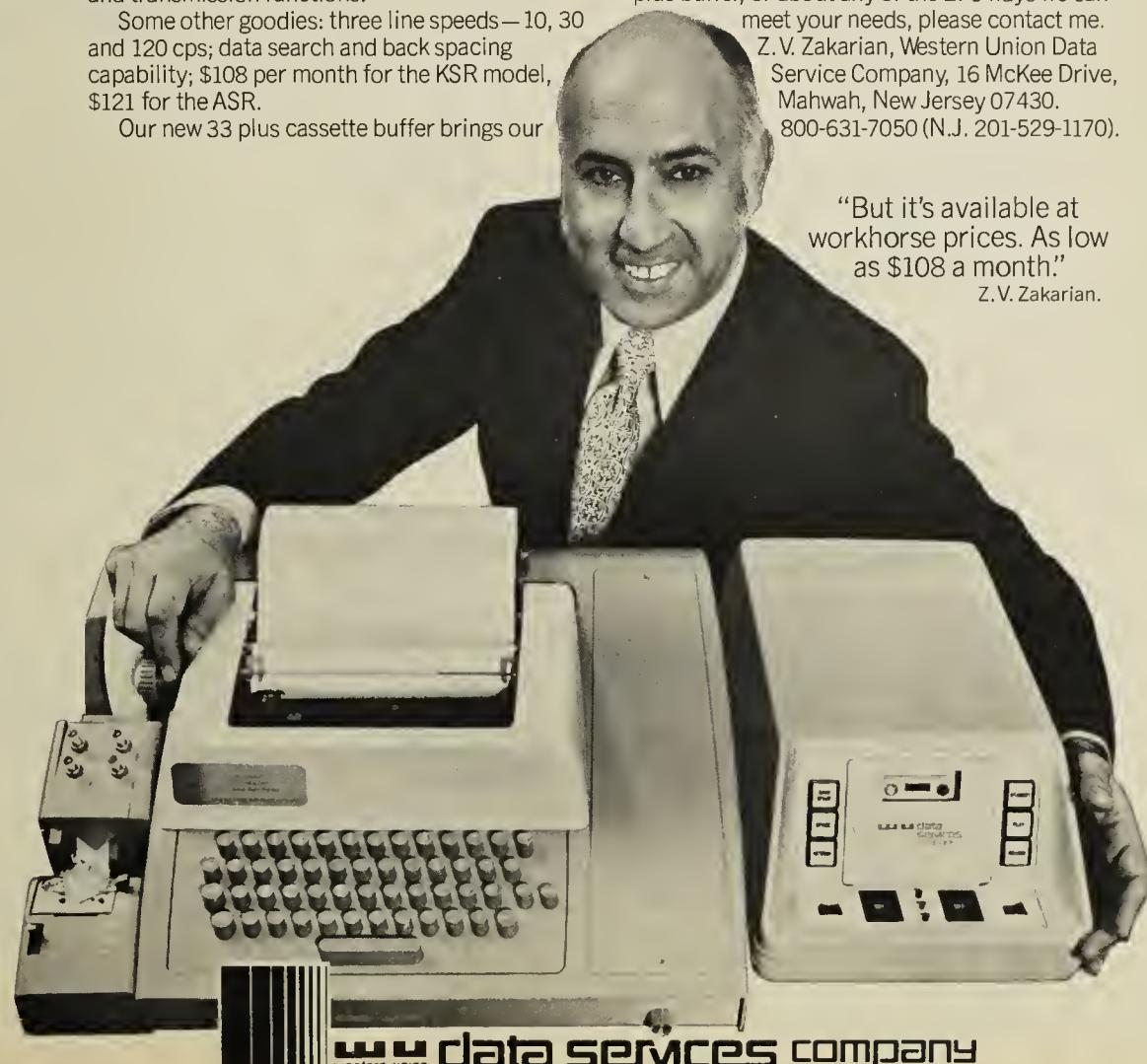
And then we support your system with our unique maintenance program, Termicare®.

If you would like more information about our 33 plus buffer, or about any of the 276 ways we can

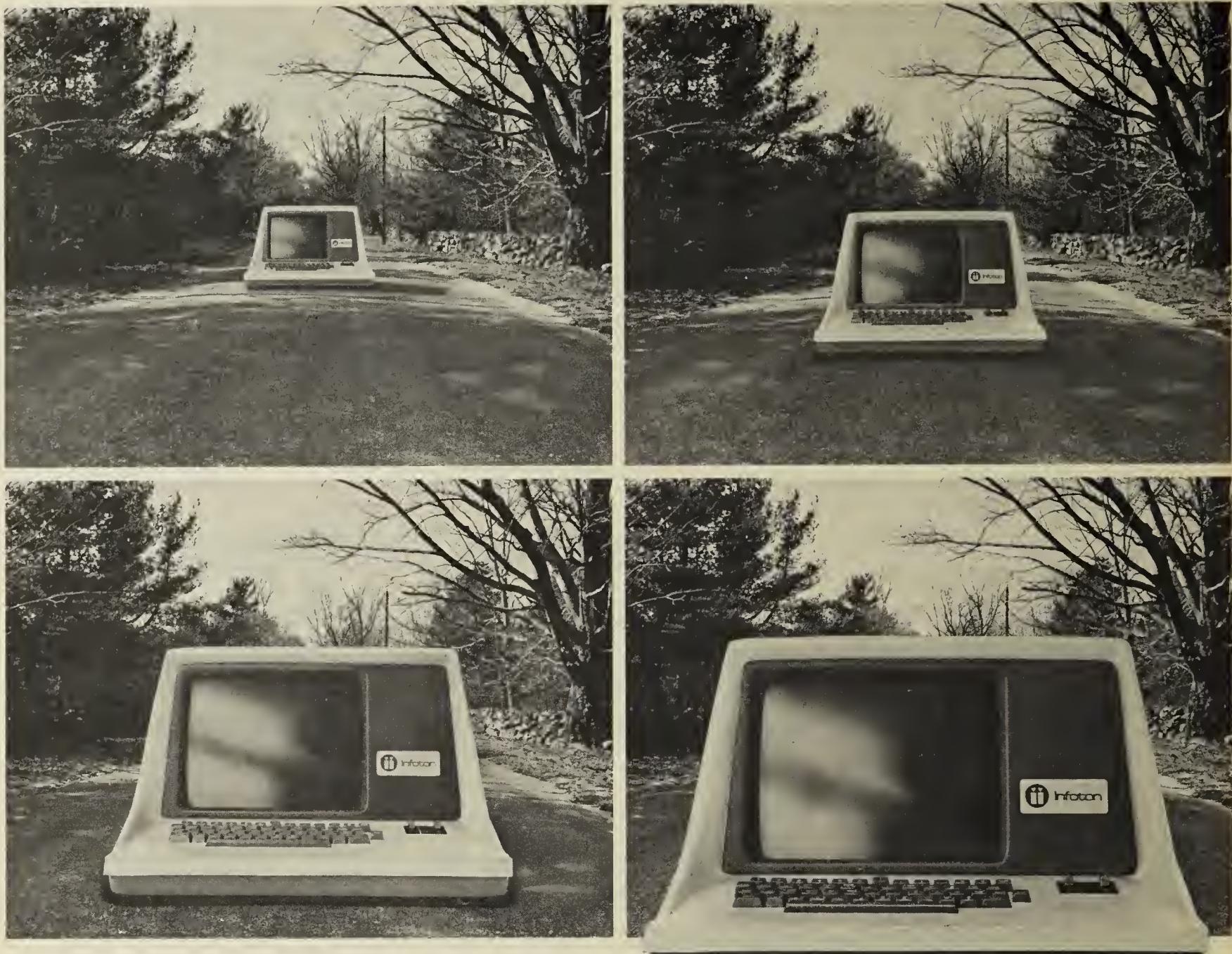
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## CI Notes

### Univac Lands Army Pact

WASHINGTON, D.C. — Sperry Univac has received a \$30 million contract from the General Services Administration for equipment to consolidate the Army's worldwide personnel accounting functions.

The contract calls for 15 Univac 1108s, with seven multiprocessors and one unit processor. More than 130 remote units, including 9200s, Uniscope 100s and DCT-500 terminals, will be tied to the central system. CPU deliveries are set to begin in August. The systems are under a lease agreement and the Army has a purchase option after one year.

### Stockholder Slaps UCC With Suit

WILMINGTON, Del. — University Computing Co. has been charged with the distribution of unlawful proxy materials in a class action suit filed in a federal court here by W. Henry du Pont.

The suit charged the firm with failing to alert holders to the charges brought against it in one of du Pont's earlier suits [CW, May 2] and with alleged irregularities in the solicitation procedure.

A UCC spokesman said: "When the first class action was filed on April 19, the proxy materials were thoroughly reviewed by outside counsel, and no deficiencies were found."

### SBC Consolidates Offices

NEW YORK — The Service Bureau Corp., recently made a subsidiary of Control Data Corp., will consolidate its New York City and Harrison, N.Y., headquarters groups into a single operation in Greenwich, Conn.

SBC's Development Laboratory in San Jose, Calif., will move into a new building in Campbell, Calif.

### Supershorts

Inforex has delivered its 2,000th key-to-disk system to Montgomery Ward.

— — —  
Computer Machinery Corp. has established Computer Machinery Canada Ltd., a Canadian subsidiary.

— — —  
The Data Communications Division of International Trading Corp. will act as Digi-Log Systems, Inc.'s exclusive European sales representative.

— — —  
Supreme Equipment & Systems Corp. has named Diebold, Inc. as a distributor of various automated electronic storage and retrieval systems. The agreement between the two firms covers a three-year period, with minimum purchases of \$300,000 in the first year.

— — —  
Xerox Corp. has established a computer marketing and technical support unit to increase the service to OEM markets.

### Decision-Making Detailed

## Independents, Not Users, IBM Worry

By E. Drake Lundell Jr.  
of the CW Staff

TULSA, Okla. — When IBM was considering how to soften the penetration of the peripheral equipment market by other manufacturers, the pros and cons of all planned moves were carefully charted and the worry was apparently more over the reactions of other manufacturers than users. The deliberations were revealed in IBM documents made public in the Telex/IBM trial.

In fact, almost all of the reasons given for or against any particular move are presented in terms of the reactions of other manufacturers, and except in a very few cases the customer reaction is hardly considered.

In the area of "technical escalation," for example, the IBM researchers found that the positive results of improving the price/performance of its products would be that such improvements would "increase OEM [other equipment manufacturers] lead time to copy" would cause the OEMs to spend development dollars

and thereby reduce their profits; would reduce the overall market for the independents and shorten their rental lives; and finally that it would force them to "discount prices earlier and deeper."

### Negative Effects

On the negative side such technical escalation would shorten the life of the IBM rental product and would serve to force the independents to develop a research and development capability, they said.

In addition, IBM noted that too much technical escalation "usually requires customer conversion which is resisted," and that some users "will trade off improved function and performance for lower price."

But in the area of architectural changes to slow the independent growth, IBM found that including more functions in its control units would make it more difficult for plug-compatible manufacturers to develop systems and would reduce the size of their market for a particular box.

The IBM planners, however, found that such moves might call for major changes in operating systems and might add to the product cost. Another disadvantage, IBM found, was that "government standards people may object."

If IBM were to go the native attachment route and have a different native attachment for each system, the planners predicted this would "reduce the size of the market for OEM, by box" and it would "make service for OEM more difficult."

### Plan Could Backfire

They found that such a scheme might increase the product costs and increase the service cost for IBM. In addition, the planners said that the scheme "may result in increased system downtime."

Another alternative open to the IBM planners was to integrate hard logic, micro code logic, with software device support "in such a way that it would be difficult for OEM" to offer plug-compatible products.

This move, the planners said, would have the advantages of making it difficult for the independents to copy and would fractionate the IBM market by boxes.

The disadvantages would be that it would probably eliminate standard selector and multiplexer channels and would present problems for present and future software products from IBM.

In addition, the independents "would probably follow us in firmware approach," the IBM planners said.

## Packaged Software and Services Market Seen Doubling by 1975

NEW YORK — The market for packaged computer software and services will double by 1975 and exceed \$2 billion by 1982, according to a study by Frost and Sullivan, Inc., market researchers here.

From the current base of \$770 million in 1972 for the two fields, the market will climb to \$1.5 billion by 1975, the report noted.

Sales of software packages alone reached \$135 million in 1972 and are expected to leap to \$410 million by 1977 reaching \$540 million by 1982, the study said.

### A Definition

"Software package" is defined as a complete plug-in program able to perform a specific system, application or utility function.

The market for packaged computer services, which reached \$635 million in 1972, is projected to climb to \$1.2 billion by 1977 and to exceed \$1.5 billion by 1982, according to the firm.

Packaged services are dominated by offerings in payroll/accounting, credit-verification and other finance-oriented services. "Strong growth is evident as well in the use of software packaged services by the wholesale-distribution business and hospital administrative processing," the study added.

The trend of time-sharing firms offering customers comprehensive processing services "has been found by T/S entrepreneurs to be the key to survival, growth and profitability," according to the re-

port.

An average of \$30,000 annually was spent on the purchase of software packages, with some firms reporting expenditures of \$300,000, the survey indicated.

### Fast-Growing Areas

Frost and Sullivan is "optimistic about the future of both software packages and packaged services" and noted that the banking and health care processing will be "among the fastest growing user groups."

Of the four major types of packaged software — total, systems, standard and applications — only standard software is singled out as a "downbeat component."

"Near saturation has been reached in some areas, while others are approaching maturity. Downward pricing pressures are very evident among some types of packages," the report indicated.

The fastest growing submarket is for "total" applications-oriented packages, which the report defines as "completely integrated programming systems which operate by virtue of their own dedicated computers."

Among the characteristics that have led to favorable opportunities for independents in the field, the report observed, is that IBM and AT&T "have both been precluded from selling computer services as the result of government antitrust actions."

Software also tends to be value priced, or sold according to its potential benefits for users, as opposed to what products actually cost to develop and market.

## Univac Drops Bid For Calif. Center

CW West Coast Bureau

SACRAMENTO, Calif. — The number of potential bidders for a controversial \$25 million plus contract for a consolidated state EDP center dwindled to three last week as Univac dropped out with a protest.

Only Control Data Corp., IBM and Honeywell have said they intend to bid for the Stephen P. Teale center, which will serve 35 state agencies.

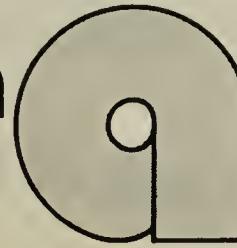
Bids are due July 30.

Univac had indicated it would bid only if written answers to questions were different from verbal answers the state had given regarding the bidding at a recent vendors' conference.

In a letter received by the state last week, Malcolm Hill, Univac branch manager in Sacramento, said the invitation to bid process "severely circumscribes Univac's ability to satisfy the stated requirements in a truly competitive and cost-effective manner."

The letter also asserted the selection process is contrary to the state's administrative manual and the intent of the legislature.

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**Documents Detail Memory Strategy****158s, 168s Designed to Stop Competition**

By E. Drake Lundell Jr.

Of the CW Staff

TULSA, Okla. — One of the advantages of putting a new type of memory on the 370/158 and 168 systems was that the new memory would not be as exposed to competition as was the memory on the 155 and 165, internal IBM documents filed in the Telex/IBM suit revealed.

Because technical considerations would make it harder for the independents to attach memory to the new systems, the price for the new memory would not have to be reduced, one memo asserted.

The memo noted that the "memory on the 155, 165 and 195 is clearly exposed to competition. PCM [plug compatible manufacturers] have the capability to design an equivalent or

better performing ferrite product and price it under our \$12K slope."

"The physical and electrical attachment job is relatively easy, since they can design the box to our M-9 interface as they have done in similar situation on System/360," the memo added.

"However," it continued, "as we move to the FET c/p design (1K bits per chip) on Olympus [158], Pisces [168] and Phoenix [19511], a different situation exists. We judge the ability for competition to add to our minimum FET memory configurations is a very large and

maybe even an impossible task."

The document contained a technical study of the different ways the independents might add memory to the IBM systems and concluded that "although no single requirement of interfacing may prove insurmountable in itself, the combined requirements that must all be met to insure a compatible attachment at viable cost and performance may well prove to be very difficult."

"In short we may be over-reacting in our [original] assumption to reduce the \$12K slope," it concluded.

**Japanese Study Liberalization**

TOKYO — Foreigners may be able to assume larger shares of ownership in Japanese computer and components firms, if a recent recommendation by the Japanese Foreign Investment Council is enacted.

The recommendation calls for almost all Japanese industry to be opened in principle to 100% foreign ownership.

However, stricter guidelines were applied to some segments of the computer industry. The report called for 50% foreign ownership of firms engaged in the manufacture, sale or leasing of computers by Aug. 4, 1974 and 100% by Dec. 1, 1975.

Firms in the software field would be allowed 50% ownership by Dec. 1, 1974 and 100% by April 1, 1976.

Currently, any single foreign institution is prohibited from acquiring more than 10% of the shares of any one Japanese firm, and groups of foreign investors are generally barred from owning more than 25% of any single firm.

Although the move reduces the limitations on foreign ownership in principle, in practice each firm will determine what percent of its shares it will allow foreigners to own.

### International Video Begins MMR-1 Delivery

SUNNYVALE, Calif. — International Video Corp. has begun delivery of its MMR-1 mass memory recorder unit.

Orders for 20 systems, valued at over \$1 million, have been received for the system, the firm said.

Texas Instruments Co. has ordered units for incorporation into a mass memory data storage and retrieval system to be used as a peripheral to the Advanced Scientific Computer.

### Periphonics Realigns With 3 Divisions

BOHEMIA, N.Y. — Periphonics Corp., in restructuring the company's marketing organization, has created three divisions within the company to develop and produce the appropriate hardware and software for various segments of the data communications market.

The new units are the Communications Processor Division, the Data Terminal Division and the Communications Software Division.

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Corporate Headquarters

## Reports 'Unhealthy Mental Situation'

# IBM Hired Psychologist to Study Personnel Losses

By E. Drake Lundell Jr.

Of the CW Staff

TULSA, Okla. — Top management at IBM was disturbed in 1970 when a psychologist it had hired reported "an underlying and unhealthy mental situation throughout the corporation," according to minutes of a management committee meeting that turned up in the IBM documents filed in the Telex/IBM suit.

The psychologist was apparently brought in to study the situation for two reasons. First,

the management committee was worried over the loss of a lot of middle management personnel, minutes of earlier meetings revealed, and secondly, a messy personnel situation resulted in the release of four people at the firm's Information Records Division (IRD) plant.

According to the notes of a Jan. 7, 1970 management committee meeting, the psychologist was called in to review the situation at the IRD installation, "why it was not previously reported and what [could] be

learned from the experience to avoid similar problems in the future."

The doctor concluded, according to the minutes, "that our organization — i.e. hierarchy, motivation — i.e., reward and punishment, and management style — i.e. aggressive masculinity contribute to such situations."

### Inconsistencies Noted

The management committee noted "a number of inconsistencies in the psychologist's discussion and in some instances,

inaccurate facts, brought about by a lack of intimate knowledge of the IBM corporation," the minutes revealed.

"Nonetheless, the management committee was disturbed by [the] contention that there is an underlying and unhealthy mental situation throughout the corporation which is not understood or appreciated," the minutes indicated.

The psychologist indicated he had no immediate solution to the problems, the minutes noted, "other than that we chal-

lenge our basic motivation assumptions and that we actively study better ways of accomplishing tasks."

The committee handed the problem to the personnel department to determine if it believed "there is any truth to the . . . charge and if so, what we are doing about it," according to the notes.

It was suggested that the personnel department might want to contact other outside experts to "see whether the hierarchical organizational system . . . may be out of phase with rapid changes occurring in society."

## Contracts

Control Data Corp. has signed an agreement with Lee Way Motor Freight, Inc. to develop and market a management information system designed specifically for the trucking industry.

MI<sup>2</sup> Data Systems, Inc. will provide \$5.6 million worth of impact matrix teleprinters to Dedmon Industries, Inc.

Novation, Inc. will provide acoustic coupler assemblies for Texas Instruments' Model 725 Portable Data Terminal.

Computer Sciences Corp. has signed a \$1.9 million contract with the Environmental Protection Agency to supply three clinical laboratories for studies of the health effects of environmental contaminants.

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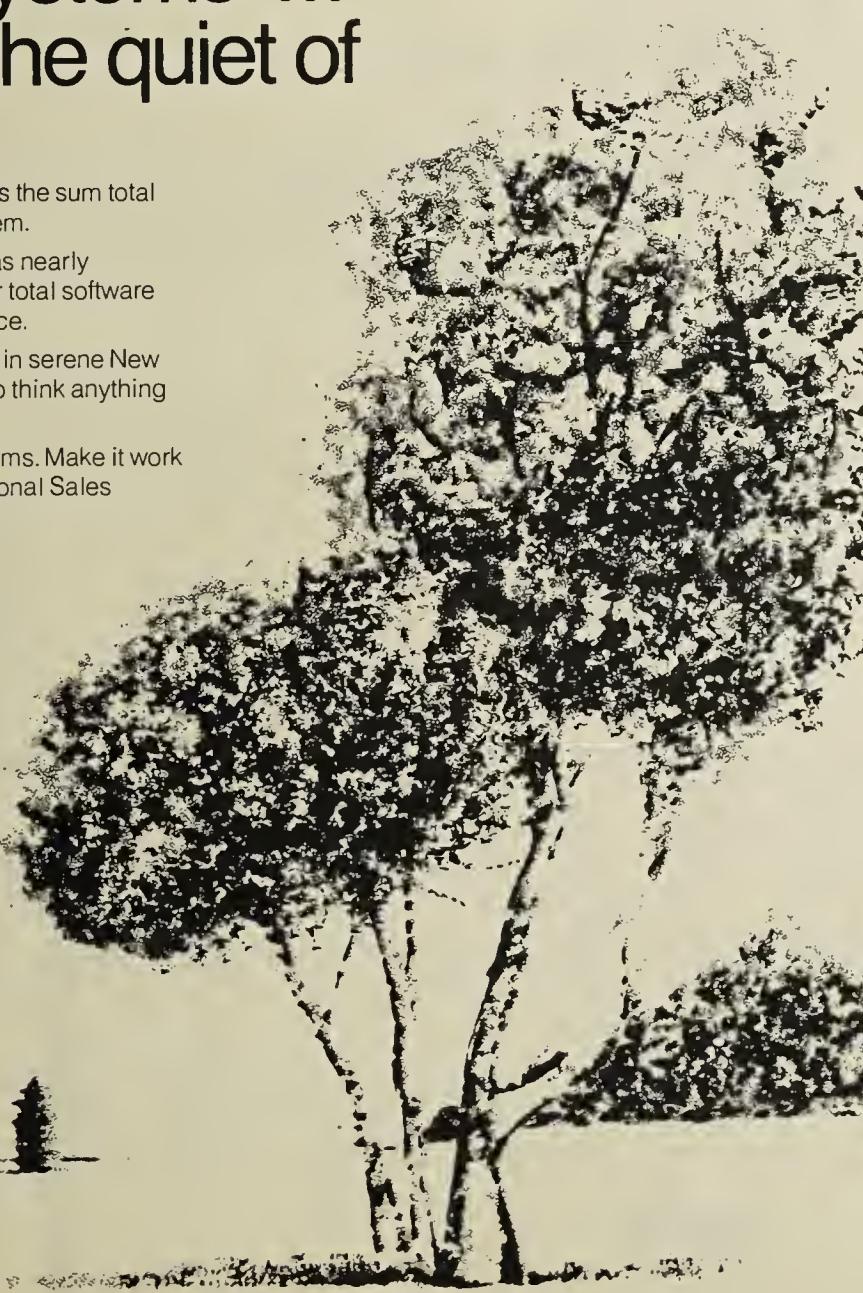
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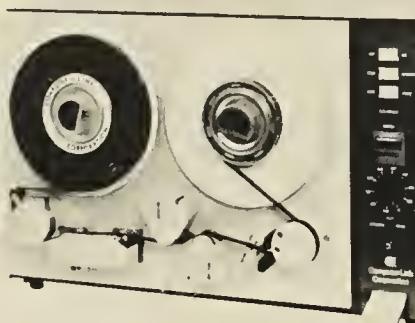
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## Financial Woes 'Solvable'

## Memorex President Optimistic

SANTA CLARA, Calif. — Memorex President Laurence L. Spitters told shareholders he thought the company could resolve its financial crisis, but did not divulge many specifics at a recent meeting here.

However, if the firm should have to cut back on its operations, the mainframe business will probably be eliminated, he said. As of the end of 1972, the firm had invested \$22.6 million in its entry into the mainframe business, according to the annual report.

Memorex expects less than \$4 million in 1973 from rentals of computer systems, he said, repeating that orders for the MRX systems are "lagging" [CW, May 23].

The company's operating plan for 1973 calls for \$79 million in financing requirements, which Memorex originally planned to meet by a combination of new equity capital, additional loans and deferrals of existing debt maturities, Spitters explained in an earlier statement.

Its inability to sell stock and obtain appropriate debt financing forced the firm to borrow about \$25 million since Dec. 31, 1972 from the Bank of America, he noted.

The bank's credits to Memorex and its subsidiaries total about \$130 million, "including 1973 maturities and demand notes of \$44 million, a portion of which represents borrowings to date in 1973 to meet current cash requirements," he said.

Failure to procure sufficient external funds will cause the company to reduce the scale of its current and planned operations, Spitters continued.

"We have not made such reductions to date because it is our belief that we shall be successful. But if we are not, such reductions would result in substantial writeoffs of amounts previously deferred, which would decrease or eliminate earnings for 1973, including first quarter earnings, and would require extension of maturities of existing debt as well as new loans, he concluded.

### Earnings on Target

The results of the first quarter at Memorex were on target, according to Spitters.

Earnings for the three months reached \$689,000 or 16 cents a share compared with \$158,000 or 4 cents a share in the year-ago quarter.

Revenues during the period rose 20% to \$41.9 million from \$34.5 million a year ago.

Order rates for disk file and communications products are as planned, as are magnetic tape and disk pack revenues, Spitters said.

International orders for media products accounted for about 10% more volume than the U.S., he noted.

Combined audio and video volume substantially exceeded computer tape volume, he added.

The leasing equipment business amounted to \$21.6 million or 52% of total revenues in the period.

"Memorex's business objectives emphasize building the base of equipment for lease, and the current operating plan for 1973 is aimed at increasing the lease

## Could Drop MRX

base by approximately 40% from its size at year-end 1972," Spitters noted.

During the quarter, the firm said it reduced its intangibles by \$1.2 million as the amount of previously deferred R&D costs and lease acquisition amortized during the first quarter exceeded amounts of such costs deferred during the quarter.

### Sale of Equity?

As an alternative to securing equity and debt financing, Memorex is conducting discussions with other firms toward a sale of a substantial equity interest or other form of business combination.

"If Memorex successfully concludes such a sale or business combination, it is anticipated that there will be a substantial dilution in the equity interests of the company's present shareholders and that a majority interest may be acquired by the purchasing or acquiring party," Spitters conceded.

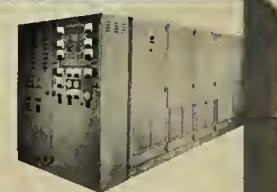
The Bank of America, which "has and is supporting" the company's 1973 operating plan, has informed Memorex it cannot "provide all the funds necessary to enable the company to implement fully its entire 1973 operating plan."

"The bank can terminate its credit support at any time, but has indicated that it will not do so as long as in the bank's opinion the company continues to make satisfactory progress toward solving its capital needs."

Spitters took aim at Wall Street and its attitude toward competitors of IBM. He attributed the firm's financial straits to Wall Street and the "monopolistic position" of IBM, noting the investment community has "failed in its role" of accumulating equity capital for firms such as Memorex. Wall Street has also discouraged investors from supporting competitors of IBM, he added.

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Through the eyes of current small business users, we'll be examining some examples of successful use of computers, and some of the pitfalls you're likely to meet in attempting to install smaller EDP systems. We'll discuss the problems involved in selecting the right equipment, summarize what computers can be expected to do, and examine the technical problems of implementing a system. We'll also weigh the advantages of outside software, and go over the question of whether or not an in-house technical staff is necessary. We'll be getting part of this information directly from small business users who participated as panelists in the 1973 Computer Caravan. So you know it will be practically oriented, useful and timely.

If you use small EDP systems in your company—or if you're thinking of doing so—this June 27th Supplement is important reading. And if you're marketing small business systems equipment or services, your ad should be there. Close is June 8th.

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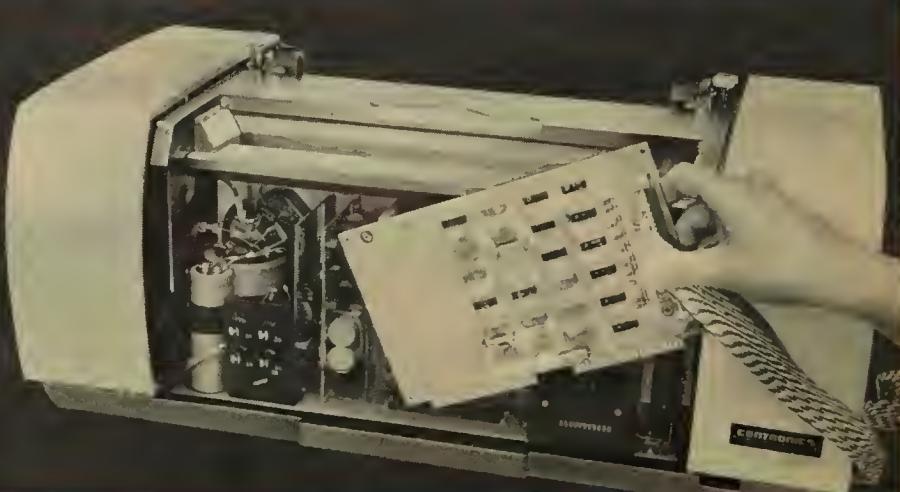
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## NCR Appoints E.F. Shipman Vice-President

DAYTON, Ohio—E.F. Shipman has been named vice-president, domestic marketing, for NCR, succeeding C.L. Keenoy, who retired April 30.

Shipman joined NCR in 1947 as a salesman for the Tampa, Fla., branch office, and became manager of the Atlanta region in 1969. In 1971 he was named vice-president of that region.

### Other Moves

- Fred T. Allen has been elected chairman of the board of Pitney Bowes and will continue

### Executive Corner

as president and chief executive officer of the firm.

■ John L. Farley Jr. has been elected president and general manager of Boothe Computer Corp.

■ Edward F. Horst Jr. has been named president of Comtech USA, Inc., a subsidiary of Comtech Group International Ltd. of Toronto, Canada.

■ Dean O. Morton has been elected a vice-president of Hewlett-Packard. He is general manager of HP's Medical Electronics Division.

■ Edward Sterris, formerly district manager for Comma Corp.'s L.A. office, has been named vice-president, western operations.

■ David S. Fehr has been named vice-president and director of computer services for National CSS Inc.

■ Herbert F. Trader has been elected vice-president, financial industry, for Control Data Corp.

■ Stephen H. Clark has been elected vice-president for Intel, Inc. He will retain his previous position of director of marketing.

■ Nat P. Turner has been named vice-president and director of bank systems development for the Industry Services Division of University Computing Utility Co.

■ Darrel G. McCollough has been elected a vice-president of California Computer Products Inc. and will head a newly created product management function.

■ John A. DeVries has been elected a group vice-president of General Instrument Corp. and head of its data systems and services group.

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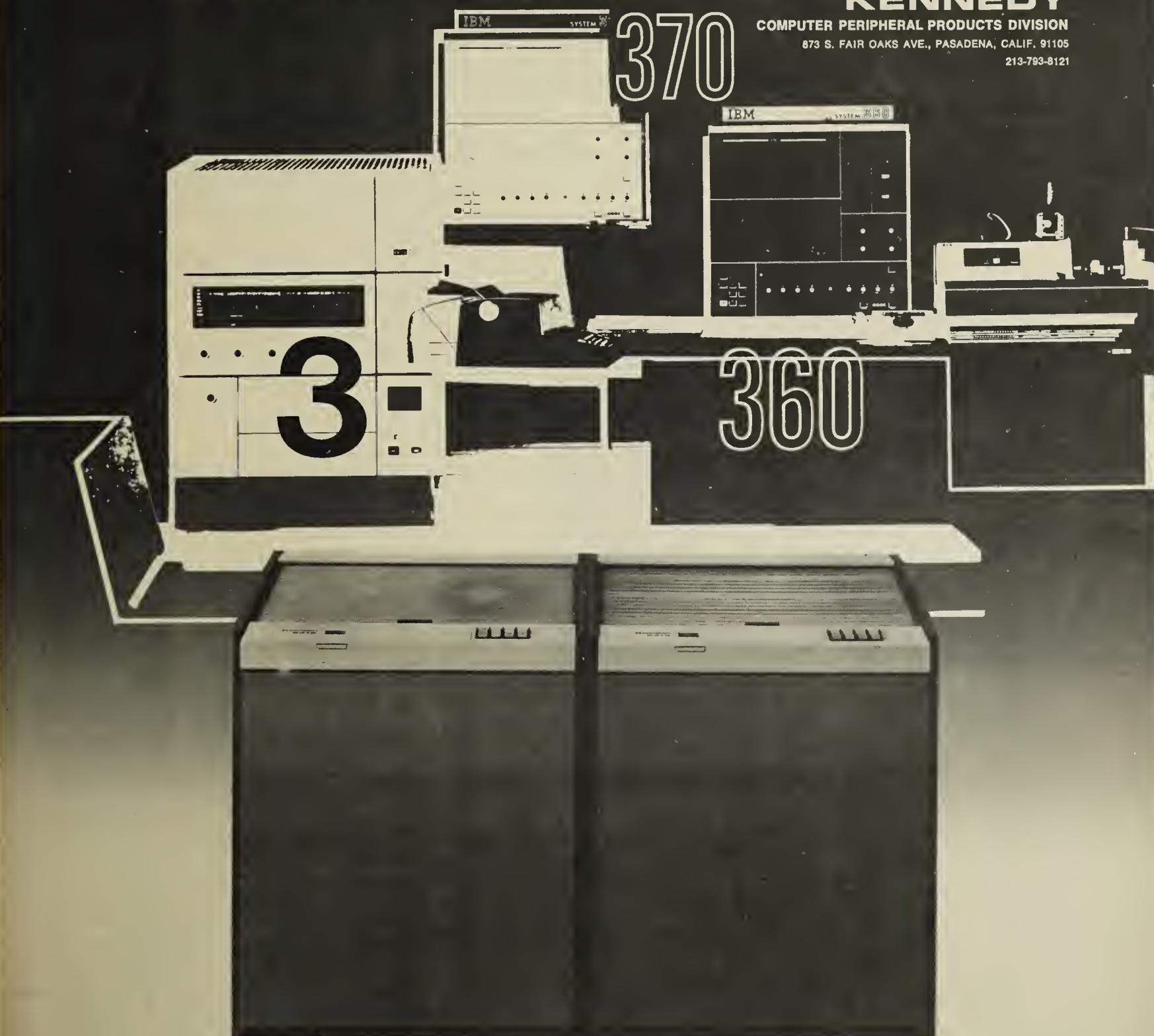
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Photo courtesy of Ocean County College, Toms River, New Jersey

## European Computer Fair Drawing Criticism; New Products Pushed

By a CW Staff Writer

HANNOVER, W. Germany — Many DP firms are not especially happy with results from the large international Hannover Fair here, although about 90 computer industry firms exhibited.

Leading German computer firms have decided not to endorse or participate in the Systems/73 Show in Munich in November, fearing their support might lead to a second international fair in Germany with results no more favorable than those of Hannover Fair.

Although the Hannover Fair attracts about 500,000 people during a 10-day period, and includes exhibits of almost every conceivable type of industrial and commercial equipment, leading DP exhibitors such as Honey-

sance, point-of-sale merchant authorization and on-line automatic teller services.

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#### Analysis

well, IBM, NCR and Burroughs have indicated they are not happy with the show.

#### Time for New Products

However, despite the doubts about the value of a large international trade fair, several DP firms chose Hannover to introduce new products.

ICL showed its new 2903 CPU, while in the peripheral area Hazeltine launched a new range of CRTs, the Series 1000. Nixdorf showed a direct telephone-to-computer communications system.

Attendees come from throughout Europe, and with the crowds it is difficult for an exhibitor to discuss with an attendee specific applications of equipment to the attendee's industry.

Exhibitors pointed out that the requirement to discuss effectively the service and support aspects of their equipment's use in the local area makes the national or international fair-type exposition of limited value in achieving real sales results.

Several DP exhibitors at Hannover indicated they could not in fact justify their investment at the fair, but were committed to long-term leases on their booths. Generally a five-year commitment is required from an exhibitor.

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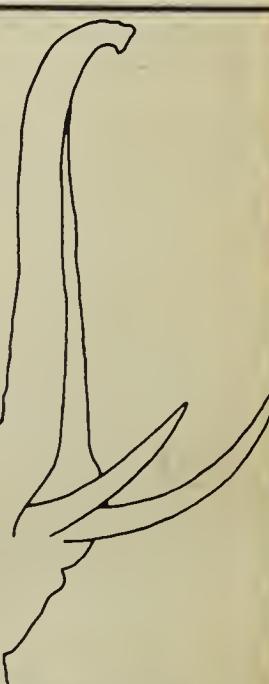
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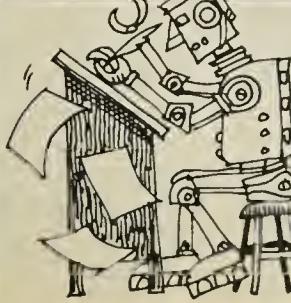
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# CSC Turnaround Shows \$367,000 for Year

LOS ANGELES — Computer Sciences Corp. reported a turnaround for the year ended March 30, with earnings totaling \$367,000 or 3 cents a share compared with a loss of \$35.7 million or \$2.67 a share a year ago.

Revenues for the period rose to \$120.5 million from \$107.5 million.

The 1973 results include the previously announced year-end

downward adjustments of \$11.6 million and an \$8.1 million after-tax gain from the sale of Commonwealth Services, Inc.

Cash proceeds from the sale were used to repay short-term indebtedness of about \$12.5 million, CSC said.

Fourth quarter results showed \$8.1 million from the sale of Commonwealth, and earnings totaled \$2.4 million or 18 cents a share compared with a loss of

\$39.2 million or \$2.93 a share in the same year-ago period.

Revenues rose to \$35.4 million compared with \$25.5 million in the fourth quarter of 1972.

## Position for Recovery

"The strengthening of CSC's financial posture resulting from the Commonwealth sale and the recent restructuring of our bank credit arrangements has established a firm position for recovery from the liquidity problem experienced by the company during the past three years," President William R. Hoover said.

The firm has renegotiated a long-term financing agreement with banks headed by First National City Bank, New York, to postpone by a year the date for making payments.

Hoover also added that Infonet revenues have doubled in the past year to a level of about \$1.6 million monthly. "With the start-up and development phase of Infonet now complete and the large attendant losses in Infonet and other significant write-offs behind us, we expect a much improved fiscal 1974," he said.

## Nickels & Dimes

Shareholders of University Computing voted to change the firm's name to Wyly Corp. President Sam Wyly said he expects the firm to be profitable for the year, and that the Datran network has the \$25 million financing needed for this year, but further financing hasn't been arranged. If market conditions improve, Wyly said the firm might sell up to 20% of Datran, or one of its wholly owned subsidiaries, to the public.

\$\$\$

United Computing Systems, a subsidiary of United Telecommunications, earned \$209,000 compared with a year-ago loss of \$433,000 in the quarter ended March 31.

## Calcomp Has Profitable 3d Quarter, But Reports Loss in Nine Months

ANAHEIM, Calif. — California Computer Products Inc. has reported sharply improved earnings in the third quarter, continuing the trend set in the second period.

President Lester L. Kilpatrick said he is looking for record revenues and a significant profit in the year ending June 30, 1973.

In the third period, Calcomp earned \$976,000 or 33 cents a share compared with a loss of \$512,000 or 18 cents a share in the same period a year ago.

Revenues rose to \$21.3 million from \$11.5 million in the 1972 third quarter.

A change in accounting

## EM&M 1st Quarter Results Improved

LOS ANGELES, Calif. — Electronic Memories and Magnetics Corp. showed vastly improved earnings for the first quarter ended March 31, and company president Trude C. Taylor said he expects earnings in the rest of the 1973 quarters to equal or top those of the first quarter.

Earnings rose to \$1.4 million or 27 cents a share compared with a loss of \$898,000 or 17 cents a share in the 1972 period.

Revenues rose 49% to \$24.7 million compared with \$16.6 million in the year-ago quarter.

Sales for the year, Trude said, should be in the \$100 million range, up from \$76.4 million last year.

methods at the end of last year produced losses for both 1972 and the first quarter.

In the nine months, Calcomp lost \$603,000 or 21 cents a share compared with a loss of \$5.7 million or \$2.15 a share in the previous year.

Revenues reached \$54.8 million, up from almost \$37 million in the 1972 period. The year-ago nine month loss included \$4.7 million cumulative effect on prior years of changing accounting methods. Under the new method of accounting, engineering and development costs and lease acquisition and installation costs are expensed as incurred.

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# Computerworld

## Stock Trading Summary

All statistics  
compiled, computed  
and formatted by  
TRADE\*QUOTES, INC  
Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, MAY 24, 1973

EXC H	PRICE								E X C H	PRICE										
	1973		CLOSE		WEEK		WEEK			1973		CLOSE		WEEK		WEEK				
	RANGE	MAY 24	NET	PCT	(1)	1973	CHNGE	CHNGE		(1)	1973	CHNGE	CHNGE	(1)	1973	CHNGE	CHNGE			
SOFTWARE & EDP SERVICES																				
O ADVANCED COMP TECH	1- 2	1 1/8	- 1/8	-10.0	O MOORE CORP LTD	53- 60	54 1/2	- 1/4	-0.4	N BURROUGHS CORP	211-245	228	+10 7/8	+5.0	A COMPUTER SYSTEMS	1973	1972			
A APPLIED DATA RES.	2- 4	2	- 1/8	-5.8	N NASHUA CORP	42- 58	46 3/8	- 2	3/8	O REYNOLDS & REYNOLU	18- 26	18 7/8	- 1/2	-2.5	Year Ended Dec. 31	1973	1972			
O APPLIED LOGIC	2- 3	1 1/2	0	0.0	O STANDARD REGISTER	40- 51	43	+2	+4.8	O TAB PRODUCTS CO	14- 20	15 1/2	- 1/4	-1.5	Three Months Ended March 31	1973	1972			
N AUTOMATIC DATA PROC	64- 94	66	-2 1/4	-3.2	O UARCO	17- 23	17 1/4	-1 1/4	-6.7	N WABASH MAGNETICS	5- 7	5	- 7/8	-14.8	Shr Ernd	\$45	\$38			
O BRANDON APPLIED SYST	1- 1	5/8	0	0.0	N WALLACE BUS FORMS	19- 26	19	- 1/2	-2.5	N WALLACE BUS FORMS	19- 26	19	- 1/2	-2.5	Spec Cred	a49,540	... Loss	353,073	1,072,749	
O COMPUTER DIMENSIONS	2- 5	3 1/2	- 1/2	-12.5	COMPUTER SYSTEMS															
O COMPUTER DYNAMICS	1- 2	5/8	0	0.0	O BURROUGHS CORP	211-245	228	+10 7/8	+5.0	N BURROUGHS CORP	211-245	228	+10 7/8	+5.0	CONRAD	1973	1972			
O COMPUTER NETWORK	1- 5	1 1/4	- 1/4	-16.6	N COLLINS HA010	18- 26	18 7/8	- 1/2	-2.5	N COLLINS HA010	18- 26	18 7/8	- 1/2	-2.5	Three Months Ended March 31	1973	1972			
N COMPUTER SCIENCES	2- 6	2 1/2	- 1/8	-4.7	N CONTROL DATA CORP	39- 62	40 3/4	- 1 3/4	-4.1	O CONTROL DATA CORP	39- 62	40 3/4	- 1 3/4	-4.1	Shr Ernd	\$45	\$38			
O COMPUTER TASK GROUP	1- 2	1 1/2	0	0.0	O DATA GENERAL CORP	29-131	33	-4	-10.8	O DATA GENERAL CORP	29-131	33	-4	-10.8	Revenue	15,892,000	13,835,000			
O COMPUTER TECHNOLOGY	1- 3	1	- 1/2	-33.3	O DIGITAL COMP CONTROL	2- 6	2 1/4	- 7/8	-28.0	O DIGITAL EQUIPMENT	73-105	85 1/2	+5 1/2	+6.8	Earnings	608,000	\$19,000			
O COMPUTER USAGE	4- 9	4 3/8	- 7/8	-16.6	N ELECTRONIC ASSOC.	4- 9	4 3/4	+ 1/2	+11.7	N ELECTRONIC ASSOC.	4- 9	4 3/4	+ 1/2	+11.7	a-in 1972, tax credit plus gain on retirement of long-term debt, less losses related to previously discontinued operations; in 1971 gain on retirement of long-term debt.	1973	1972			
O COMPRESS	1- 2	1 1/8	- 1/8	-50.0	A ELECTRONIC ENGINEER.	6- 11	6 1/4	- 1/4	-3.8	A ELECTRONIC ENGINEER.	6- 11	6 1/4	- 1/4	-3.8	DATA 100	1973	1971			
O COMSHARE	4- 9	4 1/2	- 3/4	-14.2	N FOXBORO	23- 32	25	+ 1/2	+2.0	N FOXBORO	23- 32	25	+ 1/2	+2.0	Three Months Ended March 31	1973	1972			
N COROURA CORP	6- 15	6 1/2	- 3/8	-5.4	O GENERAL AUTOMATION	26- 55	31 1/2	+3	+10.5	O GENERAL AUTOMATION	26- 55	31 1/2	+3	+10.5	Shr Ernd	\$21	\$13			
O DATATAB	2- 4	2	- 1/4	-11.1	O GRI COMPUTER CORP	1- 3	1	- 1/8	-11.1	N HEWLETT-PACKARD CO	74- 95	82 1/2	+7	+9.2	Revenue	20,789,000	18,799,000			
O EDP RESOURCES	1- 3	1	0	0.0	N HONEYWELL INC	101-139	102 7/8	-3 7/8	-3.6	N HONEYWELL INC	101-139	102 7/8	-3 7/8	-3.6	Disc Op	... a5 Spec Cred	(219,000)	216,000	325,000	
A ELECT COMP PRUG	1- 2	1	- 1/8	-11.1	M IRM	387-457	400 1/2	+3 1/2	+0.8	M IRM	387-457	400 1/2	+3 1/2	+0.8	Earnings	\$39,000	331,000			
N ELECTRONIC DATA SYS.	35- 56	40	+2 1/2	+6.6	O INTERDATA INC	7- 13	9 7/8	0	0.0	O INTERDATA INC	7- 13	9 7/8	0	0.0	a-in 1972, restated to reflect accounting changes.	1973	1972			
O INFORMATICS	2- 6	2 7/8	- 5/8	-17.8	N MEMOREX	2- 19	4 1/2	+ 1 1/2	+50.0	N MEMOREX	2- 19	4 1/2	+ 1 1/2	+50.0	DATA DOCUMENTS	1973	1972			
O 1.0.A. DATA CORP	1- 1	3/4	0	0.0	O MICRODATA CORP	3- 10	3 3/8	- 1 1/8	-25.0	N MICRODATA CORP	3- 10	3 3/8	- 1 1/8	-25.0	Three Months Ended March 31	1973	1972			
O KEANE ASSOCIATES	3- 4	3	0	0.0	N NCR	27- 35	34 3/8	+1 3/4	+5.3	N NCR	27- 35	34 3/8	+1 3/4	+5.3	Shr Ernd	\$70	\$52			
O KEYDATA CORP	7- 12	6 1/2	+ 1/8	+1.9	N RAYTHEON CO	26- 34	27 3/8	+ 1/4	+0.9	N RAYTHEON CO	26- 34	27 3/8	+ 1/4	+0.9	Revenue	9,258,728	6,954,251			
O LOGICON	4- 7	4	- 1/8	-3.0	N SPERRY RAND	36- 50	40 1/2	+2 3/8	+6.2	N SPERRY RAND	36- 50	40 1/2	+2 3/8	+6.2	Tax Cred	23,785	23,873			
A MANAGEMENT DATA	2- 5	1 3/4	- 1/4	-12.5	A SYSTEMS ENG. LABS	3- 8	3	0	0.0	A SYSTEMS ENG. LABS	3- 8	3	0	0.0	Earnings	328,708	242,709			
O NATIONAL CSS INC	8- 41	23 1/4	- 3/4	-3.1	O VARIAN ASSOCIATES	10- 20	11 1/2	- 5/8	-5.1	O VARIAN ASSOCIATES	10- 20	11 1/2	- 5/8	-5.1	6 Mo Shr	1.22	.97			
O NATIONAL INFO SVCS	1- 2	1	- 1/8	-11.1	N WANG LABS.	14- 34	15	- 1/4	-1.6	N WANG LABS.	14- 34	15	- 1/4	-1.6	Revenue	17,106,316	13,564,428			
P ON LINE SYSTEMS INC	13- 17	13 1/2	+ 1/2	+3.8	N XEROX CORP	141-169	153 1/2	+12 1/4	+8.6	N XEROX CORP	141-169	153 1/2	+12 1/4	+8.6	Tax Cred	35,364	37,680			
PERIPHERALS & SUBSYSTEMS																				
N ADDRESSOGRAPH-MULTI	14- 34	14	- 1 1/8	-7.4	A BOOTH COMPUTER	1- 5	1 3/8	- 3/8	-21.4	O COMPUTER INVSTRS GRP	2- 8	2 3/4	- 3/4	-20.0	MACRODATA	1973	1972			
O ADVANCED MEMORY SYS	8- 23	8	- 1 1/2	-15.7	O BRENSNAHAN CUMP.	1- 2	2 1/8	0	0.0	O COMPUTER INVSTRS GRP	2- 8	2 3/4	- 3/4	-21.4	Three Months Ended March 31	1973	1972			
N AMPEX CORP	4- 7	3 3/4	- 3/8	-9.0	O COMDISCO INC	8- 17	7 3/4	- 7/8	-10.1	N COMDISCO INC	8- 17	7 3/4	- 7/8	-10.1	Shr Ernd	\$17	\$16			
O ANDERSON JACOBSON	3- 6	3	- 1/4	-7.5	O COMMERCE GROUP CORP	3- 4	2 3/4	- 3/4	-21.4	O COMMERCE GROUP CORP	3- 4	2 3/4	- 3/4	-21.4	Revenue	1,339,698	896,553			
O BEEHIVE MEDICAL ELEC	6- 10	6 1/2	- 1/2	-7.1	O COMPUTER EXCHANGE	1- 1	1 1/2	- 1/8	-20.0	O COMPUTER EXCHANGE	1- 1	1 1/2	- 1/8	-20.0	Earnings	133,228	100,863			
A BOLT-BERANEK & NEW	7- 12	6 3/4	- 3/8	-5.2	A COMPUTER INVSTRS GRP	2- 8	2 3/4	0	0.0	A COMPUTER INVSTRS GRP	2- 8	2 3/4	0	0.0	STANDARD REGISTER	1973	1972			
N BUNKER-RAMO	6- 18	9 1/8	- 3 3/8	-27.0	O COMP. INSTALLATIONS	1- 2	1	- 1/2	-33.3	O COMP. INSTALLATIONS	1- 2	1	- 1/2	-33.3	Three Months Ended April 1	1973	1972			
A CALCOMP	5- 13	7 1/8	- 1/4	-3.3	A DTPF INC	5- 9	5 3/8	- 5/8	-10.4	N DTPF INC	5- 9	5 3/8	- 5/8	-10.4	1973	1972				
O CAMBRIDGE MEMORIES	10- 15	10 1/4	-1	-8.8	M DATRONIC RENTAL	2- 3	2 1/4	0	0.0	M DATRONIC RENTAL	2- 3	2 1/4	0	0.0	1973	1972				
O CENTRONICS DATA CUMP	13- 28	19 1/2	- 1/2	-2.5	A OCL INC	2- 3	1 5/8	- 3/8	-18.7	A OCL INC	2- 3	1 5/8	- 3/8	-18.7	1973	1972				
O CODEX CORP	10- 19	11	- 1/2	-4.3	O DEARHORN-STORM	14- 26	15 5/8	+ 3/4	+5.0	O DEARHORN-STORM	14- 26	15 5/8	+ 3/4	+5.0	1973	1972				
O COGNITRONICS	1- 3	1 1/2	- 3/8	-20.0	A OPA, INC.	5- 8	5 1/4	- 1/8	-2.3	A OPA, INC.	5- 8	5 1/4	- 1/8	-2.3	1973	1972				
O COMPUTER COMMUN.	2- 4	1 5/8	- 1/8	-7.1	A GRANITE MGT	2- 6	2 7/8	0	0.0	A GRANITE MGT	2- 6	2 7/8	0	0.0	1973	1972				
A COMPUTER EQUIPMENT	2- 3	2 3/8	- 1/8	-5.0	N GREYHOUND COMPUTER	3- 6	3 3/8	- 1/4	-6.8	N GREYHOUND COMPUTER	3- 6	3 3/8	- 1/4	-6.8	1973	1972				
O COMPUTER MACHINERY	7- 13	6 3/4	- 7/8	-11.4	A ITEL	4- 12	4 5/8	- 3/4	-13.9											

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